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The Milbank Memorial Fund
QUARTERLY

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IN THIS ISSUE

THE inclusion of Negro populations in the Health Survey conducted by the United States Public Health Service in 1935-1936 provides data on illness among approximately 230,000 Negro persons and fills an important lack in the morbidity data previously available. In "Health of the Negro," Dorothy F. Holland and George St. J. Perrott present a preliminary analysis of records for 30,000 Negroes in four of the cities in the Health Survey. The results of an earlier survey in 1933 in a Negro district and a low-income white district in New York City also are discussed. Negroes form an important part of the underprivileged groups in the United States and better understanding of their special health problems is essential as a basis for an effective public health program. These surveys show that the illness record for Negroes as compared with whites is especially unfavorable in the adult ages.

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What has happened to class differences in birth rates in recent years? In this issue are published for the first time some preliminary results from fertility data collected by the United States Public Health Service in connection with its National Health Survey of 1935-1936. These are embodied in "Variations in Birth Rates According to Occupational Status, Family Income, and Educational Attainment" by Clyde V. Kiser. The above report is confined to results from five large cities included in the survey and for present purposes the data are restricted mainly to 16,831 native-white marriages in which the wives were of childbearing age. The preliminary findings suggest that in recent years the "uppermost" classes may have lost one of their traditional badges of distinction. Families in the highest income class were not characterized by lowest birth rates. Highest fertility levels, however, were universally found among families of "lowest" status with respect to occupation, income, or education.

OK

Of timely interest is "A Demographic Study of 38,256 Rural Families in China," by Frank W. Notestein of Princeton University. This article presents in condensed form some of the major population findings derived in connection with a study of land utilization made by Professor J. Lossing Buck of Nanking for The China Institute of Pacific Relations. Despite the obstacles encountered in securing first-hand information from an illiterate peasant population, it is believed that the present report gives a truer picture of the composition and vital processes of the rural Chinese population than has heretofore been afforded. Data are presented concerning the family, age and sex, marriage, birth rates, and death rates. The general picture is far from encouraging. On examining the materials in this careful study, one cannot but feel that poverty, illiteracy, and long-continued wastage of human resources through excessive births and deaths are fundamental factors underlying the weakness of China in her troublous times of today.

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In "A Summary of Data on Reported Incidence of Abortion," Dorothy G. Wiehl has reviewed recent data for general population groups and for clients of birth control clinics in different sections of the United States. For urban groups of married women, a number of independent studies indicate that approximately 15 per cent of pregnancies are terminated by abortion, 10 per cent are spontaneous, and 5 per cent are induced abortions.

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The third section of the series on "Impairments in a Rural Population" appears in this number. The previous sections have dealt with the general prevalence of impairments and with specific impairments diagnosed from the history record. In the present section the objective findings of the physical and laboratory examinations are presented with a commentary on the problems encountered in the analysis of such data.

HEALTH OF THE NEGRO¹

by DOROTHY F. HOLLAND AND GEORGE ST. J. PERROTT

PART I

DISABLING ILLNESS AMONG NEGROES AND LOW-INCOME WHITE FAMILIES IN NEW YORK CITY—A REPORT OF A SICKNESS SURVEY IN THE SPRING OF 1933

THE Central Harlem and Lower East Side districts of New York City are areas of low average economic status, the Central Harlem district being populated largely by Negroes, while in the Lower East Side persons of foreign birth or parentage predominate. Both districts are areas of high mortality, the death rate for all causes in each area in the period 1929-1933 showing an excess of approximately 4 per 1,000 over the rate for the entire City (1). In the same period, the tuberculosis death rate in Central Harlem was over three times as high as the rate for the City, exceeding the rate for all other health districts, and its infant and mortality rates were the highest observed. In the Lower East Side, mortality was excessive for diseases common to adults—the cardiovascular-renal diseases, cancer, diabetes, and pneumonia—reflecting the effect of the higher average age of its population.

The high mortality rates and low average economic level common to the two districts assure comparability of the districts in respect to these factors. We thus have for experimental observation Negro and white groups in which certain variables are, to some extent, constant. The relative health status of the Negroes of Central Harlem, and the predominantly foreign-born population of the Lower East Side as indicated by their illness rates is therefore of special interest. Data for such a comparative study were obtained in sickness surveys conducted by the United States Public Health Service and the Milbank Memorial Fund in the spring of 1933. The basic data for Negroes relate to 1,348 families in Health Area 12 of

¹ From the Division of Public Health Methods, National Institute of Health.

Central Harlem and were collected by the Milbank Memorial Fund in collaboration with the Emergency Work and Relief Bureau of New York City.² Comparable data for white families were obtained in a sickness survey conducted by the United States Public Health Service and the Milbank Memorial Fund and relating to 7,436 families in poor areas of eight large cities, including 1,225 in the Lower East Side of New York City. A detailed description of the method and scope of the survey has been published previously (2). In both investigations a complete record of illness occurring during the three months prior to the date of the survey was obtained for each member of the family. The beginning dates of the three-month periods for the illness record extended approximately from December 20, 1932 to February 15, 1933. Information concerning continuity of employment, wages earned, and other income received by each member of the family was secured for each year from 1929 through 1932. The present report on the results of this survey in the Central Harlem and Lower East Side districts of New York City summarizes in part data previously published (3). Certain results of the survey of white wage-earning families in eight cities—Baltimore, Birmingham, Cleveland, Detroit, Pittsburgh, Syracuse, and New York City—are presented for comparison, including some data not previously published.

COMPOSITION AND CHARACTERISTICS OF THE POPULATION

The comparability of the surveyed groups in Central Harlem and the Lower East Side from the standpoint of occupational composition, economic level, and depression history is indicated by figures shown in Table 1, in which data for the total number of white surveyed families in eight cities are included for comparison. Skilled

² The complete survey covered 2,256 families and extended over a period of about nine months in 1933. In order to avoid bias arising from seasonal variations, the present Negro sample is restricted to 1,348 families enumerated contemporaneously with white families included in a sickness survey conducted during the spring of 1933. For a description of the Harlem survey, see Kiser, C. V.: Fertility of Harlem Negroes. *The Milbank Memorial Fund Quarterly*, July, 1935, xiii, No. 3, pp. 273-285.

workers predominated among the wage-earners of the Negro families of Central Harlem and the white families of the Lower East Side. Both areas were affected similarly by the period of the economic depression, approximately two-thirds of the chief wage-earners in both districts being employed on full time in 1932, while

Table 1. Percentage distribution of surveyed families by (1) occupational status of chief wage-earner, (2) number of wage-earners in family in 1929, 1932, (3) families on relief at any time during 1932.

CLASSIFICATION	CENTRAL HARLEM— NEGRO	LOWER EAST SIDE WHITE	EIGHT CITIES ¹ WHITE
	PERCENTAGE DISTRIBUTION OF FAMILIES		
Occupational Status of Chief Wage-Earner ²			
White Collar	16	19	21
Skilled Labor	57	55	58
Unskilled Labor	27	26	21
Wage-Earners in Family ³			
1929			
All Unemployed	0.7	3.3	3.8
Having Income or Pension	0.5	3	3
All Other	0.2	0.3	0.8
One or More Part-Time, No Full-Time	9	12	14
One or More Full-Time	90	84	82
1932			
All Unemployed	3	14	16
Having Income or Pension	2	8	6
All Other	1	6	10
One or More Part-Time, No Full-Time	32	28	36
One or More Full-Time	65	58	48
Families on Relief			
1929	0.3	0.7	1
1932	8	13	20
Number of Families Observed	1,348	1,225	7,436

¹ Weighted average. The cities include: Baltimore, Birmingham, Brooklyn, Cleveland, Detroit, New York (Lower East Side), Pittsburgh, Syracuse.

² Excludes unknown occupations. The term "white-collar" is here used to include all workers other than skilled and unskilled laborers, that is, professional, proprietary, and clerical. "Skilled" includes "semiskilled." Farm laborers were present to a negligible extent and have been included with unskilled laborers. Household heads living on income or pension are not included with the unemployed in 1932 and are excluded from the population in making this computation.

³ Welfare work, when the sole occupation, was considered "unemployed."

INCOME CLASS ¹	CENTRAL HARLEM —NEGRO	LOWER EAST SIDE —WHITE	EIGHT CITIES —WHITE	CENTRAL HARLEM —NEGRO	LOWER EAST SIDE —WHITE	EIGHT CITIES —WHITE
	Percentage Distribution of Families			Number of Families		
ALL INCOMES	100	100	100	1,348	1,225	7,436
Poor	25	33	36	341	405	2,690
Moderate	34	37	43	457	450	3,181
Comfortable	41	30	21	550	370	1,565

¹ See footnote 5.

Table 2. Percentage distribution of surveyed families by income range, based on per capita family income, 1932.

the proportion of full-time workers in 1929 was between 80 and 90 per cent.

The distribution of the surveyed families according to per capita family income for the year 1932 shows a somewhat higher proportion of the "poor," and a lower proportion of the "comfortable," in the Lower East Side than in the Central Harlem district (Table 2). In interpreting the Negro-white comparisons of morbidity, therefore, it should be remembered that the whites do not represent an "average" white group but were drawn from poorer areas.

THE INCIDENCE OF DISABLING ILLNESS

The disabling³ illness rate from all causes for the three-month survey period among Negroes of Central Harlem was 143 per 1,000 persons, this rate showing a small excess, 4 per cent, over the rate for the white population of the eight large cities, which was 138 per 1,000 (2). In the white population of the Lower East Side, the disabling illness rate was 157 per 1,000, representing an excess of 9 per cent over the Negro rate, and 14 per cent, over the rate for the eight large cities.

When age adjusted rates are compared, the slight excess in the disabling illness rate of Central Harlem over the eight-city rate disappears, the age adjusted rate for Central Harlem, 136 per 1,000,

³ Cases of illness which caused disability of any duration are included. Disability was defined as inability to carry on usual activities.

being 1 per cent lower than the white rate for the eight cities combined. Age adjustment increases the rate for the Lower East Side to 159 per 1,000, which is 17 per cent higher than the age adjusted rate for Central Harlem, and 15 per cent higher than the eight-city rate.

Variation with Age and Sex. The above gross comparisons, however, conceal the true situation. The higher case rate in the Lower East Side than in Harlem arises in large part from the excess in rates for children under 10 years of age. The several groups of data used in this report suggest a fairly uniformly lower rate of sickness among

Negro children under 15 than among comparable white children. It will appear later that the very high rate among surveyed children in the Lower East Side was due in part to the prevalence of measles in this area at the time of the survey. However, the rate for Negro children was lower than the average rate for white children in the eight cities.

From Figure 1 it will be seen that after the age of 15 the case rates for disabling illness in Harlem were uniformly higher than those for both of the white surveyed groups. In the adult ages, rates for the Lower East Side show close agreement with those for the eight cities. The higher rates for Negroes accrued from the con-

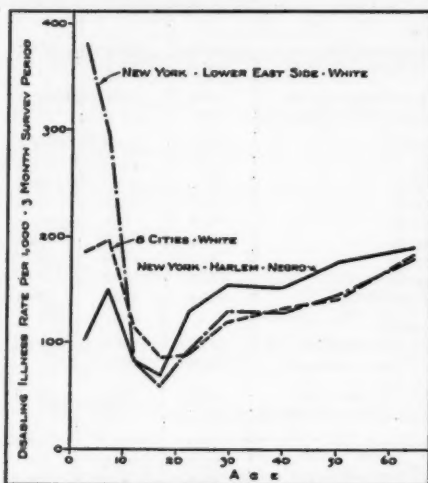


Fig 1. Age-specific rate of disabling illness during a three-month period in the early spring of 1933 among persons in Negro and white families in New York City and white families in eight large cities (Baltimore, Birmingham, Cleveland, Detroit, Pittsburgh, Syracuse, New York, and Brooklyn).

SEX AND AGE	DISABLING ILLNESS RATE PER 1,000 FOR THREE-MONTH SURVEY PERIOD			POPULATION OBSERVED		
	Central Harlem— Negro	Lower East Side— White	Eight Cities White	Central Harlem— Negro	Lower East Side— White	Eight Cities White
Males						
All Ages—Crude	101.9	146.4	123.6	1,707	2,261	15,717
All Ages—Adjusted ¹	102.6	150.5				
15 and Over—Crude	97.6	112.2	107.0	1,260	1,622	10,812
15 and Over—Adjusted ¹	97.5	111.0				
Under 5	106.9	340.4	177.9	159	141	1,231
5-9	144.7	314.5	199.9	152	248	1,836
10-14	88.2	92.0	108.3	136	250	1,838
15-19	51.6	42.8	73.2	97	257	1,666
20-24	82.5	78.1	73.1	97	192	1,272
25-34	88.6	89.6	85.6	395	279	2,220
35-44	94.4	128.0	120.8	360	375	2,343
45-54	122.5	153.3	122.2	204	300	1,850
55 and Over	149.5	169.0	166.3	107	219	1,461
Females						
All Ages—Crude	179.6	168.1	151.8	1,982	2,278	15,913
All Ages—Adjusted ¹	163.3	167.7				
15 and Over—Crude	196.2	138.1	145.8	1,580	1,578	10,975
15 and Over—Adjusted ¹	186.5	137.0				
Under 5	96.3	417.1	192.0	135	175	1,255
5-9	155.8	276.9	191.1	154	260	1,805
10-14	79.6	75.5	122.5	113	265	1,878
15-19	86.0	76.9	101.2	93	234	1,640
20-24	158.5	113.6	103.5	164	132	1,266
25-34	201.8	165.6	152.9	570	326	2,426
35-44	205.7	128.1	143.9	384	367	2,335
45-54	222.2	133.9	162.2	234	254	1,665
55 and Over	222.2	188.7	198.4	135	265	1,643
Number of Disabling Illnesses, All Ages						
Males	174	331	1,942			
Females	356	383	2,416			

¹ Adjusted to the age-sex distribution of the white population observed in the eight cities.

Table 3. Disabling illness rate by age and sex—three-month survey period—1933—Central Harlem, the Lower East Side, and eight cities compared.

sistently excessive age-specific rates among Negro females. In fact, the rates of Harlem Negro males exceeded those among Lower East Side males only during the ages 15-24. (Table 3.) Expressed in summary fashion, the adjusted⁴ rate among Harlem males, 15

⁴ Adjusted to the age-sex distribution of white individuals included in the combined sample for the eight cities.

years of age and over, was approximately 12 per cent lower than among comparable white males in the Lower East Side and nearly 9 per cent lower than among adult males included in the surveys for eight cities. On the other hand, the corresponding sickness rate among Negro females 15 years of age and over in Harlem was 36 per cent higher than that observed among white women of comparable ages in the Lower East Side and about 28 per cent higher than that found for white females in the eight cities.

The three surveyed groups showed the excess in the disabling illness rate for females, compared with that of males, which has been frequently observed. However, the excess in the rate for female Negroes in Central Harlem over that of Negro males was very much greater than the excess for females in both of the white groups.

Disabling Illness by Cause. The respiratory diseases were found to be the most frequent cause of illness in each of the three surveyed areas, the disabling illness rate due to these causes varying from 61, in the Lower East Side, to 72, in the Central Harlem district. (Figure 2 and Table 4.) For this group of diseases, the rate for Negroes thus exceeded the rates for both of the white surveyed groups. The digestive diseases and injuries due to accidents also appeared in higher rates among Negroes than among whites in the samples

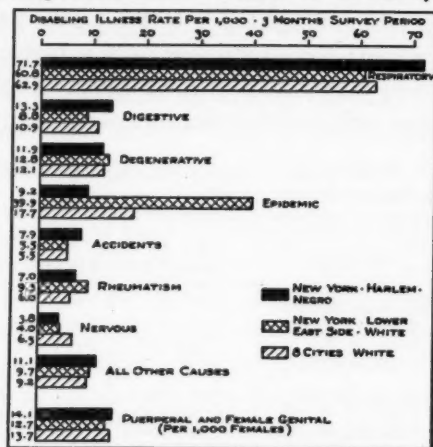


Fig. 2. Rate, during a three-month period, of disabling illness classified in broad diagnosis groups: Negro and white families in New York City and white families in eight large cities surveyed in the early spring of 1933. Sole or primary causes only.

considered. On the other hand, the rate for the group of epidemic diseases among Negroes was notably low. In nonepidemic periods, Negro children appear to show low susceptibility to certain acute communicable diseases. In the Lower East Side, the rate for the epidemic diseases was over twice as high as that for the eight large cities; examination of the incidence of these diseases by specific cause indicated that measles was unduly prevalent in the area, the

Table 4. Age incidence of disabling illness classified in broad disease groups—three-month survey period.

DISEASE GROUP	ALL AGES	AGE GROUPS							
		0-4	5-9	10-14	15-24	25-34	35-44	45-54	55 and Over
Respiratory Diseases									
Negro—C. Harlem	71.7	71.4	81.4	39.7	42.1	84.9	75.3	89.0	53.7
White—L. East Side	60.8	98.1	98.4	52.4	39.3	56.2	64.7	50.5	53.7
White—8 Cities	62.9	90.9	90.6	64.6	45.7	59.6	60.7	55.5	55.4
Epidemic Diseases									
Negro—C. Harlem	9.2	17.0	65.1	7.9	2.2	4.1	1.3	2.3	
White—L. East Side	39.9	272.2	175.2	5.8	1.2	3.3			
White—8 Cities	17.7	66.4	76.6	18.3	3.6	2.8	1.5	1.7	0.3
Digestive Diseases									
Negro—C. Harlem	13.3	3.4		11.9	15.5	11.4	18.8	16.0	24.8
White—L. East Side	8.8		3.9	1.9	4.9	8.3	8.1	25.3	16.5
White—8 Cities	10.9	6.4	3.8	8.1	9.4	9.0	13.7	18.5	19.0
Degenerative and Nervous Diseases and Rheumatism									
Negro—C. Harlem	22.7	3.4	3.3	11.9	13.3	12.4	30.9	41.1	82.6
White—L. East Side	26.0	3.2	2.0	9.7	11.0	18.2	36.4	46.9	78.5
White—8 Cities	24.6	7.6	8.2	9.7	9.8	17.2	30.1	45.5	82.2
Accidents									
Negro—C. Harlem	7.9	3.4		4.0	8.9	14.5	6.7	4.6	8.3
White—L. East Side	5.5	3.2	5.9	5.8	3.7	8.3	4.0	3.6	10.3
White—8 Cities	5.5	2.4	5.8	5.1	3.9	5.4	6.6	6.0	8.7
Puerperal and Female Genital Diseases¹									
Negro—C. Harlem	14.1				15.6	22.8	23.4	8.5	
White—L. East Side	12.7				8.2	58.3	10.9	3.9	7.5
White—8 Cities	13.7				15.8	41.2	22.3	9.0	3.0
All Other Causes²									
Negro—C. Harlem	11.1	3.4		7.9	13.3	14.5	6.7	18.3	20.7
White—L. East Side	9.7	6.3	9.8	7.8	8.6	3.3	9.4	16.2	16.5
White—8 Cities	9.2	11.3	10.4	9.7	7.4	5.2	8.6	9.7	15.8

¹ Rates per 1,000 females.

² Exclusive of puerperal and acute female genital diseases.

rate for this cause alone being 28.4 per 1,000 persons, compared with a rate of 6.0 per 1,000 for the Central Harlem district.

Age Incidence for Certain Broad Disease Groups. Classification of the disabling illnesses in broad disease groups according to age reveals certain important differences between the age incidence of certain diseases in the Negro and white surveyed groups. The figures, shown in Table 4, indicate that the excess in the disabling illness rate for respiratory diseases among the Negroes of the Central Harlem district arises from the higher Negro rates observed between the ages 25 and 54 years. The rates among Negro children were lower than among whites. This fact, together with the lower frequency of the epidemic diseases among Negro children, accounts for their relatively low incidence rate from all causes of illness, previously shown in Figure 1. The age-specific rates for Negroes for the group of chronic diseases, including the degenerative and nervous diseases, and rheumatism, show a slight excess over the white rates in the age periods 10 to 14 and 15 to 24 years. On the whole, however, the disabling illness rates for the chronic diseases among Negroes are low in consideration of their high mortality from certain of these causes.

Illness Rates According to Income and Employment Status. Although the total Negro and white groups represented in this survey were fairly comparable with regard to average low economic status, it is of interest to compare disabling illness rates between groups of Negroes and whites classified with respect to actual income⁵ and employment status. When this is done, as in Figures 3 and 4, several very interesting situations emerge. The occurrence of an epidemic of measles in the Lower East Side during the survey period resulted in an abnormally high illness rate. For the purpose of the subsequent comparison, the disabling illness rates for both the Negro

⁵ The range in per capita income for six cities: Baltimore, Birmingham, Cleveland, Detroit, Pittsburgh, and Syracuse, was as follows: Comfortable, \$425 and over; moderate, \$150-\$424; poor, under \$150. For the Central Harlem and Lower East Side districts of Manhattan, and for Brooklyn, the range was as follows: Comfortable, \$500 and over; moderate, \$250-\$499; poor, under \$250.

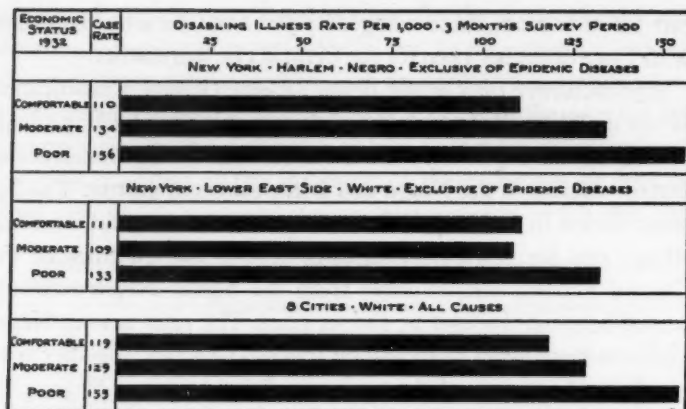


Fig. 3. Rate of disabling illness during a three-month period among persons classified by family economic status: Negro and white families in New York City and white families in eight large cities surveyed in the early spring of 1933. Rates adjusted for age. Illness rates are simple averages of rates in the eight cities.

and white population of New York have therefore been determined after the exclusion of illnesses due to epidemic diseases.

From Figure 3 it is clearly evident that increase of sickness rates with lowering of income status holds true among Negroes as well as among whites. It also appears that the excess of Negro rates over those among whites does not persist in the groups classed as "comfortable," but is restricted to those in the "moderate" and "poor" income groups.

In the grouping of data with reference to employment status of wage-earners (Figure 4), it is seen that illness rates among Negro families consistently exceed those among white families of corresponding status. Nevertheless, there is again shown among Negroes as well as among whites the inverse association between illness and economic status or employment status. Perhaps the chief point of importance yielded by Figures 3 and 4 is the sensitiveness of illness rates to slight changes in income and employment status, even when all data are confined to neighborhoods which would be judged as "poor" by present-day housing standards.

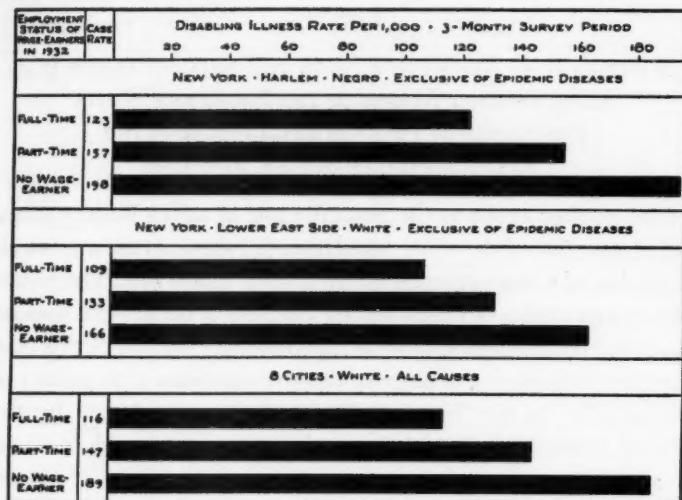


Fig. 4. Rate of disabling illness during a three-month period among persons classified by family employment status. Negro and white families in New York City and white families in eight large cities surveyed in the early spring of 1933. Rates adjusted for age. Illness rates are simple averages of rates in the eight cities.

SUMMARY

A survey of illness among Negro families in Central Harlem and white families in the Lower East Side districts of New York City was made by the Milbank Memorial Fund and the United States Public Health Service in the early spring of 1933. Both districts are areas of low average economic status and high mortality. The results indicated an excess of disabling illness among Negroes in the adult ages, but a lower illness rate for Negro children under 15 years of age than for white children. This relation was due to the lower incidence of certain epidemic diseases among the Negro children. The same inverse relation between the disabling illness rate and economic status was observed among Negroes as among whites, indicating the importance of such factors as standard of living and occupation in evaluating racial differences in morbidity and mortality rates.

PART II

A PRELIMINARY REPORT ON A STUDY OF DISABLING ILLNESS IN A
REPRESENTATIVE SAMPLE OF THE NEGRO AND WHITE
POPULATION OF FOUR CITIES CANVASSED IN THE
NATIONAL HEALTH SURVEY, 1935-1936

The marked excess in the mortality rate of urban Negroes compared with that of the white population (4) supports the *a priori* assumption of a proportionate excess in their illness rate. The results of previous studies of illness among Negroes in the general population have contributed somewhat inconclusive evidence of this relation due to limitation of scope of the investigations, or to paucity of the sample. In the National Health Survey conducted by the United States Public Health Service in 1935-1936,⁶ records of illness in a twelve-month period were obtained for approximately 230,000 Negroes. While the analysis of records for the entire surveyed group has not yet been completed, the results for a group of 30,652 Negroes and 140,263 white persons canvassed simultaneously in four large cities are of sufficient interest to justify their presentation in this preliminary report.

The surveyed group comprises a sample taken from two Southern cities, Atlanta, Georgia, and Dallas, Texas; one Northern city, Newark, New Jersey; and one city of the East North Central section, Cincinnati, Ohio. A representative sample was obtained by an arbitrary division of the Census Enumeration districts into units having an average population of 750, a random sample of such units being completely canvassed.

The distribution of the surveyed population in each city by color is shown in Table 5, with comparative figures for the total population as enumerated in the Federal Census of 1930. "Negro" as used in this survey includes also persons of other color or race. The

⁶ A preliminary announcement of the survey contained a reproduction of the survey schedule and the original list of cities to be canvassed. See The New Health Survey. *Journal of the American Medical Association*, October 5, 1935, 105, p. 1127.

ENUMERATION	FOUR CITIES	ATLANTA	CINCINNATI	DALLAS	NEWARK
	PERCENTAGE DISTRIBUTION				
Health Survey 1935-1936					
Negro	18	36	12	16	11
White	82	64	88	84	89
Federal Census 1930					
Negro	16	33	11	17	9
White	84	67	89	83	91
	NUMBER OF PERSONS				
Health Survey 1935-1936					
Negro	30,652	14,027	4,930	5,707	5,988
White	140,263	24,578	36,048	31,033	48,604

Table 5. Percentage distribution of the surveyed population by color, with comparative figures for the total population from the Federal Census of 1930—Atlanta, Cincinnati, Dallas, Newark, and the four cities combined.

number of such persons is negligible in each of these cities except Dallas, in which the total of 5,707 "Negro" persons includes also one per cent Mexicans.

The proportion of children under 15 years of age was somewhat higher, and the proportion of persons 65 years of age and over slightly lower, among the surveyed Negro population than the white (Appendix Table 1). The proportion of males in the Negro population was lower than in the white population, the ratio of males to females (females being taken as 100) being 80 for the Negro and 92 for the white population of the four cities combined.

The major difference between the surveyed groups is found in their dependency and economic status. Persons receiving relief during the year preceding the survey represented 42 per cent of the Negro group, compared with 15 per cent for the white. The distribution of the surveyed population of the four cities by color according to family income received in the year preceding the survey date is shown in Table 6, and the distribution for each city is given in Appendix Table 4.

RELIEF STATUS AND FAMILY INCOME	PERCENTAGE DISTRIBUTION		NUMBER OF PERSONS	
	Negro	White	Negro	White
ALL INCOME	100	100	30,651	140,263
Under \$1,000	88	34	26,835	47,742
Relief	42	15	12,811	21,548
Nonrelief	46	19	14,024	26,194
\$1,000-\$1,999	10	40	3,097	55,663
\$2,000-\$2,999	.9	15	163	20,498
\$3,000 and Over	.4	9	126	12,803
Income Unknown	1.0	2	331	3,557

Table 6. Percentage distribution of the surveyed population by color, according to family income and relief status during the twelve-month period prior to the survey date, 1935-1936, four cities combined.

Negroes in surveyed families with an annual income of \$1,000 or less comprised 88 per cent of the total Negro population while only 34 per cent of the white population was in this income class. In the white population, 24 per cent of all persons were in families with an annual income of \$2,000 or more; Negroes in this income class represented only 1 per cent of the total.

The implications of this divergence in economic level of the Negro and white surveyed populations of these four cities must be borne in mind in the interpretation of the subsequent comparison of their sickness experience. In Part 1 of this report, the data relate to Negro and white groups both of which represent samples of low-income families taken from the poorer districts of the surveyed communities. In the present section, we are concerned with samples of Negro and white populations which are, in general, representative of the total Negro and white population of the four surveyed cities, and necessarily differ in economic composition.

METHOD OF ANALYSIS

In general, the magnitude of the mortality rate is determined by the chronic diseases, which have become the leading causes of death. On the other hand, the magnitude of the incidence rate of illness is determined by the acute diseases, many of which are

epidemic in nature. Inter-city variation in the incidence rate of illness for a single year is therefore not significant, since it may arise in part from local variation in the prevalence of epidemic diseases.⁷ With the effect of this variable recognized, however, the validity of certain internal relations of the illness rate for each city is not altered, and comparison may be made of the relative variation of the rates for Negro and white surveyed groups according to age, sex, cause, and economic status. In the present report, therefore, the practice has been adopted of showing the ratio, or index, of the various measures of illness for individual cities, the absolute values of rates being presented only for the combined population of the four surveyed cities.

VARIATIONS IN ILLNESS RATES FOR ALL CAUSES

On the day of the canvass, which was made in the winter months between October, 1935, and April, 1936, the average prevalence rate of illness in the combined Negro population of the four surveyed cities was 5.9 per cent, compared with a rate of 4.5 per cent for the white population. These rates are somewhat higher than those previously reported (8, 9), including in the present survey disabling gross impairments not usually recorded. In the twelve-month period prior to the date of the survey, illnesses disabling for seven consecutive days or longer⁸ occurred at a rate of 183 per 1,000

⁷ Specific illustration of the point may be drawn from the experience of two cities included in this study. The year 1935, to which most of the illness records obtained in the National Health Survey relate, was an epidemic year for measles in Newark. For the City as a whole, 6,907 cases were reported to the Health Department in 1935, compared with 491 cases, for the preceding year (5). In Cincinnati, cerebro-spinal meningitis was epidemic in 1935, 238 cases being reported, compared with an average of 26 cases for the period 1931-1934 (6). In Cincinnati in 1935, there occurred also an epidemic of myalgia, or pleurodynia, a disease prevalent among children and young adults, of which 282 cases were reported. The number of cases of these diseases enumerated in the total surveyed population was relatively small, but their concentration in the period of childhood is a factor to be recognized in the interpretation of illness rates for children under 15 years of age in these cities.

⁸ In this category are included all confinement, hospital, and fatal cases without reference to the duration of disability. "Disabling" is used in the sense of inability to work or pursue usual activities.

population among Negroes, the rate for the white population being 163. In the surveyed Negro group the disability rate, derived from the total days of disability experienced in a twelve-month period arising from illnesses of the category previously defined, distributed over the total surveyed population, including the sick and the well, represented an average of 12.6 days of disability per person; for the white population, the comparable figure was found to be 8.9 days per person. The severity rate, or the average duration per case within the survey year, was 69 days for the average case among Negroes, and 54 days for the average case in the white population. In the Negro population, 4.4 deaths were reported for every 100 cases of disabling illness, the case fatality rate for the white being 3.8. The death rate in a twelve-month period for Negro persons surveyed was 8.1 per 1,000 compared with a rate of 6.2 for the white group, the rates for both groups being lower than recorded death rates for the total population of these cities, a deficiency usually observed in the house-to-house enumeration of deaths. The actual death rate in the combined total population of these four cities for the period 1930 to 1932 was 21.0 for Negroes, and 12.2 for the white population.

In Table 7, the ratios of the Negro to the white rates for these various measures of morbidity and mortality are presented for each surveyed city, and for the four cities combined.

It will be observed that the largest and most consistent excess in the rates for Negroes occurs in the related⁹ prevalence and disability rates, the magnitude of which is determined largely by the chronic diseases. On the other hand, the excess for Negroes is lowest, and shows the greatest inter-city variation, for the disabling illness rate, and the ratio of deaths to disabling illnesses (the case fatality rate), both of which are weighted by the high frequency of acute diseases. Within individual cities, it will be noted that these

⁹ The annual disability rate divided by 365 gives the average daily prevalence rate, the closeness of agreement between this derived prevalence rate and the observed prevalence rate depending on the effect of seasonality on the latter.

RATE	FOUR CITIES RATE		RATIO, NEGRO TO WHITE RATE (WHITE RATE=100)				
	Negro	White	Four Cities	Atlanta	Cincinnati	Dallas	Newark
Prevalence Rate, Day of Canvass ¹	5.9	4.5	131	125	135	104	134
12-Month Survey Period							
Disabling Illness Rate ²	183.2	163.3	112	97	134	103	125
Disability Rate ³	11.6	8.9	143	131	146	108	140
Severity Rate ⁴	69.0	54.3	127	134	109	105	112
Case Fatality Rate ⁵	4.4	3.8	117	136	97	135	82
Death Rate per 1,000	8.1	6.2	131	133	130	139	102
Annual Death Rate per 1,000 1930-1932 (Total Population)	21.0	12.2	172	190	159	198	163

¹ Persons disabled on the day of the canvass per 100.

² The rate of occurrence, in a twelve-month period, of illnesses disabling for seven consecutive days or longer, per 1,000 persons. See also footnote 8, p. 19.

³ The days of disability per person, in a twelve-month period, arising from illnesses as defined in (2) above.

⁴ The days of disability per case of disabling illness as defined in (2) above.

⁵ Deaths per 100 illnesses disabling for seven consecutive days or longer. See also footnote 8, p. 19.

Table 7. A comparison of various measures of morbidity and mortality, by color, expressed as rates, for the four cities combined, and as ratios of Negro to white rates for Atlanta, Cincinnati, Dallas, and Newark.

related rates are consistently correlated, the former directly, the latter inversely.

VARIATION WITH AGE

The excess observed in the *prevalence rate* of Negro compared with white persons of all ages is accounted for by the higher rates of Negro adults, Negro children under 15 years of age showing lower rates than white children. (Figure 5.) Examination of prevalence rates for diseases classified broadly as "acute" and "chronic" on the basis of duration of symptoms¹⁰ (Appendix Table 1) indi-

¹⁰ In the present survey, the causes of illness were classified by two methods: (1) by specific diagnosis, as measles, pneumonia, rheumatism—permitting broad grouping of diseases as "infectious," "acute diseases of the respiratory system," and "chronic diseases," etc.; (2) by duration of disease symptoms in classes as "less than three months," and "three-months duration or longer"—permitting a broad classification of diseases as "acute," i.e., those with symptoms of less than three-months duration, and "chronic," i.e., those with symptoms of three-months duration or longer. The effective separation of acute and chronic diseases by the latter method has been shown in a preliminary report (See reference 10). In the present report, the variation of prevalence and disabling illness rates by age in detailed classes is shown by cause broadly classified as acute or chronic on the basis of duration of disease symptoms (Appendix Table 1).

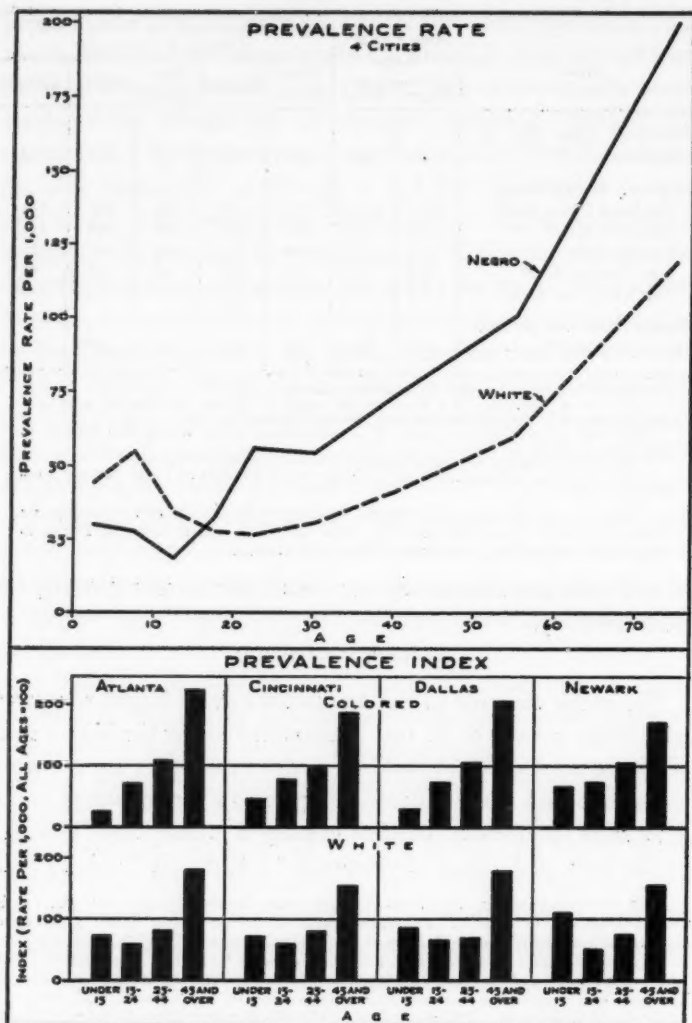


Fig. 5. Prevalence of disabling illness by age among persons in Negro and white families in four large cities canvassed in the winter of 1935-1936 as part of the National Health Survey.

AGE PERIOD	PREVALENCE RATIO (WHITE RATE=100)				
	Four Cities	Atlanta	Cincinnati	Dallas	Newark
ALL AGES	131	125	155	104	134
Under 15	56	44	97	38	80
15-24	162	148	198	112	189
25-44	177	164	183	155	181
45 and Over	164	151	188	118	147

Table 8. Prevalence ratios of Negro to white rates, classified by age in broad groups for Atlanta, Cincinnati, Dallas, Newark, and the four cities combined. (Based on the prevalence rate, all ages, i.e., persons disabled on the day of the canvass, 1935-1936.)

cates that the low average rate of Negro children is due to the relatively low prevalence of acute diseases among them, the prevalence rates for the chronic diseases more closely approximating those of white children. The excessive death rates of Negroes in infancy and early childhood, compared with the white, suggest that their lower average prevalence rates in this age period may result in part from incomplete enumeration of their illnesses.

The pattern of the age variation of the prevalence rate for the Negro and white surveyed groups of the four cities combined is reflected by the prevalence index (ratio of the rate at a given age to the rate at all ages) for each of the surveyed cities. (Figure 5.) In Newark, both Negro and white children under 15 years of age formed a higher proportion of those sick on the day of the canvass than in the three remaining cities, due to the epidemic prevalence of measles during the period of the survey.

While the prevalence rate for Negro children under 15 was lower than the rate for white children in each city (Table 8), the excess in the white rate was notably less in both Cincinnati and Newark, indicating the effect of the epidemics previously noted on children of both racial groups.

In the disabling illness rate, likewise, the excess observed in the Negro rate for persons of all ages compared with the white arises from the excess in the rate for adults. (Figure 6.) The peak in the

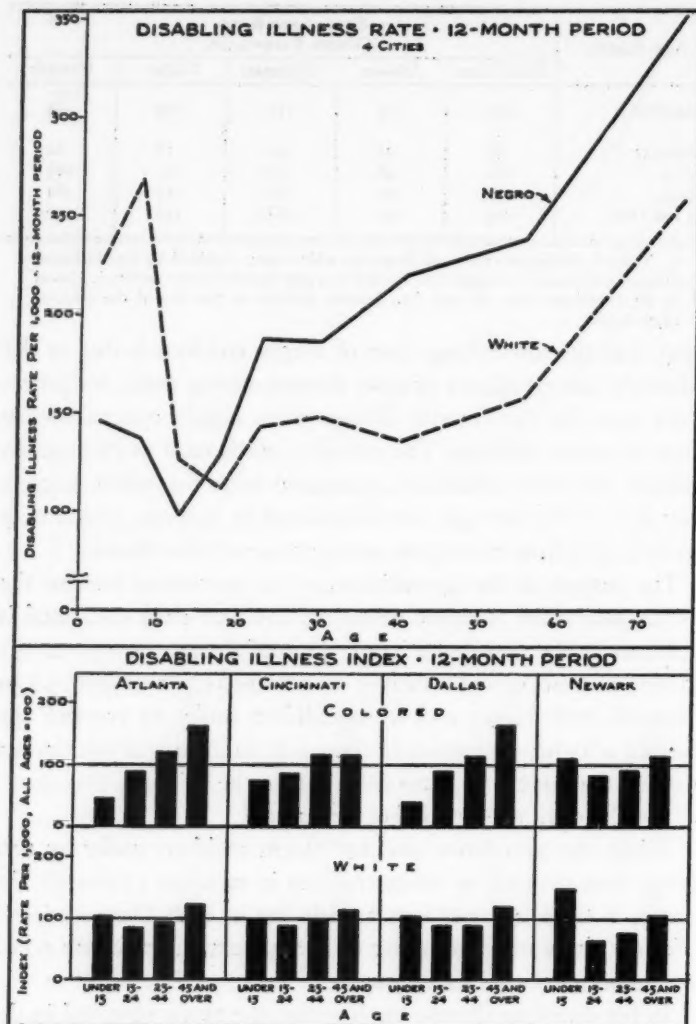


Fig. 6. Annual rate of disabling illness by age among persons in Negro and white families in four large cities canvassed in the winter of 1935-1936 as part of the National Health Survey.

AGE PERIOD	DISABLING ILLNESS RATIO (WHITE RATE=100)				
	Four Cities	Atlanta	Cincinnati	Dallas	Newark
ALL AGES	112	97	134	103	125
Under 15	61	44	103	38	93
15-24	124	101	129	105	161
25-44	141	122	160	130	146
45 and Over	143	128	137	142	135

Table 9. Disabling illness ratios of Negro to white rates classified by age in broad groups for Atlanta, Cincinnati, Dallas, Newark, and the four cities combined. (Based on the disabling illness rate, all ages, i.e., the rate of occurrence, in a twelve-month period, of illnesses disabling for seven consecutive days or longer.)

disabling illness rate of white children, occurring in the age period 5 to 9, is not observed in the curve for Negro children, due to the lower frequency of the acute diseases among Negro children; on the other hand, the disabling illness rates for the chronic diseases among Negro children, while lower than the white, show a less marked difference between the two races. (Appendix Table 1.) The sharp rise in the disabling illness rate of Negroes after 15 years of age is notable; the period of youth, (15 to 24 years) in which the illness rate of the white population reaches a minimum, is a period of a relatively high sickness rate for the Negro. The average disabling illness rate among Negroes at this age period in the four surveyed cities was 24 per cent higher than the rate for the white population, the excess being greater in the ages upward from 25 years. (Table 9.)

Sex Variation. The excess observed in the prevalence rate of illness among Negroes compared with the white population in the four surveyed cities is common to both sexes, the excess being somewhat higher for females (Table 10). On the other hand, the disabling illness rate of Negro and white males was found to be approximately the same, the excess observed among Negroes of both sexes compared with the white population being accounted for by a higher disabling illness rate among Negro females, the rate exceeding the rate for white females by 19 per cent. The disabling

illness rates for all causes, however, conceal the fact that both male and female Negroes show a marked excess in disabling illness due to the chronic diseases (Appendix Table 1), compared with white persons of the same sex.

The sex differential in both prevalence and disabling illness rates was found to be similar for both Negro and white surveyed groups, the rates for females exceeding that for males, a relation commonly observed in illness rates, although reversed in mortality rates. The ratio of the prevalence rate for Negro females was 133, compared with a ratio of 119 for white females, the male rate being taken as 100. The comparable ratios for the disabling illness rates were 155 for Negro females, and 129 for white females. The sex differential in the disabling illness rate for Negroes is marked at

Table 10. Prevalence and disabling illness ratios of Negro to white rates, by sex, and prevalence and disabling illness ratios of female to male rates, by color, in Atlanta, Cincinnati, Dallas, Newark, and the four cities combined. (Based on prevalence and disabling illness rates, all ages, specific for sex. For rates in the four cities combined, see Appendix Table 1.)

RATE	FOUR CITIES	ATLANTA	CINCINNATI	DALLAS	NEWARK
RATIO, NEGRO TO WHITE RATE (WHITE RATE=100)					
Prevalence Rate ¹					
Males	121	114	133	87	126
Females	136	132	172	115	139
RATIO, FEMALE TO MALE RATE (MALE RATE=100)					
Negro	133	122	137	150	148
White	119	106	106	114	134
RATIO, NEGRO TO WHITE RATE (WHITE RATE=100)					
Disabling Illness Rate ²					
Males	99	84	117	88	114
Females	119	104	144	111	131
RATIO, FEMALE TO MALE RATE (MALE RATE=100)					
Negro	155	157	157	167	151
White	129	126	117	132	131

¹ Persons disabled on day of the census.

² The rate of occurrence, in a twelve-month period, of illnesses disabling for seven days or longer.

ages 10 to 14 years, the excess for females at this age period being accounted for largely by their higher rate for the chronic diseases. In the white population, the sex differential is not marked until the succeeding age period (15 to 19 years) is reached (Appendix Table 1).

THE RELATIVE FREQUENCY AND SEVERITY OF ILLNESS
AMONG NEGRO AND WHITE SURVEYED GROUPS, BY CAUSE

The average amount of disability per person (sick and well) in an annual period (disability rate) is the product of two factors: the average annual duration per case of illness (severity rate), and the average number of cases of illness per person in an annual period (frequency, or disabling illness rate). The excess observed in the disability rate of Negroes in the four cities for all causes of illness (Table 7) thus follows from the fact that both their severity and frequency rates are higher than the comparable rates for the white population. We may now proceed to a consideration of these rates by cause in broad diagnosis groups in order to define the diseases which account for the greater severity of illness among Negroes.

Considering Negroes of the adult ages (Table 11),¹¹ it is seen that the excess in the disability rate of Negroes from all causes of illness is the resultant of the longer average duration and the higher frequency of cases of all disease groups, the single exception occurring among the acute diseases of the digestive system, in which the effect of a shorter average duration per case is offset by a higher frequency

¹¹ In Table 11 the severity rates, disabling illness rates, and disability rates are shown by cause as determined by specific diagnosis, with the following exception: the classification of disabling illnesses of three disease groups—respiratory, digestive, and female genital—as acute or chronic was made on the basis of duration of disease symptoms by the method described on page 21. Within two of these groups, however, certain causes were tabulated by specific diagnosis: in the respiratory group, pneumonia, respiratory tuberculosis, asthma and hay fever, and sinusitis; in the digestive group, appendicitis, ulcer of the stomach or duodenum, diseases of the gall bladder or liver, and hernia, the broad classification as “acute” or “chronic” being applied therefore to residual groups representing “other respiratory diseases” except those noted, and “other digestive diseases” except those noted. This procedure was made necessary by the limitations of tabulating facilities for this preliminary report. It should be noted however that the majority of diseases in the chronic group were classified by specific diagnosis. See Appendix Table 2 for a complete list of diseases comprising the chronic group.

of cases. However, differences may be observed in the degree to which the various disease groups contribute to the excess in the

Table 11. Disability, severity, and frequency rates for a twelve-month period and ratios of Negro to white rates, by cause, for broad disease groups for persons under 15 years of age, and 15 years and over: four cities combined.

DIAGNOSIS GROUP	DISABILITY RATE (Days of Disability per Person)				SEVERITY RATE ¹ (Days of Disability per Case)				DISABLING ILLNESS RATE PER 1,000 PERSONS			
	Under 15 Years		15 Years and Over ²		Under 15 years		15 years and over ³		Under 15 Years		15 Years and Over ²	
	Negro	White	Negro	White	Negro	White	Negro	White	Negro	White	Negro	White
	Negro	White	Negro	White	Negro	White	Negro	White	Negro	White	Negro	White
ALL CAUSES	3.83	5.27	15.84	9.97	30.8	26.1	77.5	65.9	124.6	201.8	204.7	151.3
Infectious	0.94	1.72	0.20	0.19	22.2	22.8	42.2	40.4	42.5	75.7	4.8	4.6
Acute												
Respiratory	0.85	1.20	1.06	0.70	16.5	15.5	21.2	17.9	51.3	77.4	50.1	39.0
Acute Digestive	0.09	0.25	0.41	0.37	22.8	27.1	30.7	34.9	4.0	9.4	13.4	10.6
Puerperal and Acute Female												
Genital	0.003	0.003	0.67	0.51	*	*	26.7	25.8	0.12	0.18	25.0	19.0
Accidents	0.23	0.34	0.94	0.74	34.3	30.8	51.1	46.6	6.7	11.0	18.3	15.8
Chronic												
Diseases ⁴	1.32	1.10	10.75	6.46	129.1	96.8	138.4	127.6	10.2	11.4	77.7	50.6
All Other Causes	0.40	0.65	1.81	1.01	40.7	38.9	118.6	94.7	9.8	16.8	15.3	10.7
Puerperal and Acute Female Genital ⁴	0.006	0.006	1.17	0.97	*	*	26.7	25.8	0.24	0.36	43.7	37.8
	DISABILITY RATIO (WHITE RATE = 100)				SEVERITY RATIO (WHITE RATE = 100)				DISABLING ILLNESS RATIO (WHITE RATE = 100)			
ALL CAUSES	73		139		118		118		62		135	
Infectious	55		105		97		105		56		103	
Acute												
Respiratory	71		151		107		119		66		129	
Acute Digestive	36		111		84		88		43		127	
Puerperal and Acute Female												
Genital	*		131		*		104		67		125	
Accidents	68		127		112		110		61		116	
Chronic												
Diseases ⁴	119		166		133		108		90		153	
All Other Causes	62		179		105		125		58		144	
Puerperal and Acute Female Genital ⁴	*		121		*		104		67		116	

* Not shown because of the small number of cases.

¹ Based on cases with duration of disability known. The number of cases of unknown duration for the four cities combined was 7 for the Negro, and 19 for the white.

² Includes a small number of unknown age.

³ For the diseases included in this group see Appendix Table 2.

⁴ Based on female persons or cases.

disability rate. The average duration of a case of chronic disease in the twelve-month period among Negro adults was 138 days, the longest duration observed; the average Negro adult had .078 cases of chronic disease, a frequency exceeding that of all other disease groups. The disability rate due to the chronic diseases is, therefore, at a maximum, amounting to approximately eleven days for the average Negro adult. Among white adults, the chronic diseases likewise showed the highest disability rate, but the absolute magnitude of the rate for Negroes is greater, due to the higher severity and frequency rates among Negroes for the chronic diseases.

Among Negro children under 15 years of age, the duration of the average case of disabling illness from all causes was 18 per cent higher than that of the average white case. However, the frequency of cases among Negro children, was 38 per cent lower than among white children, with the result that the average Negro child was disabled approximately four days in the twelve-month period, compared with a rate of five days for the average white child. Among Negro children, a lower frequency rate of disabling illness occurs consistently in all disease groups. The frequency rate for the chronic diseases, however, is only slightly lower than that for white children, and the excess observed in their severity rate from these causes operates to produce a somewhat higher disability rate for chronic disease among Negro children.

Disability and frequency rates for certain specific causes of illness are shown in Appendix Table 2, by age in broad groups. It is notable that the average amount of disability per Negro adult due to respiratory tuberculosis is only slightly higher than that for the average white adult, due to the shorter average duration per case of this disease among Negroes. An interesting racial difference is observed between the disability rates for appendicitis and "other acute digestive diseases," Negroes showing a definitely lower rate for appendicitis, but a marked excess for other acute diseases of the digestive system.

Disability, severity, and frequency ratios of Negro to white rates by cause in broad disease groups for persons of all ages are shown for each city in Appendix Table 3. A marked excess in the disability rate for the chronic diseases among Negroes is observed in three of the four surveyed cities, the excess varying from 42 per cent for Newark, to 60 per cent for Cincinnati. In Newark, the disability rate for the infectious diseases among Negroes was only 8 per cent lower, and in Cincinnati, 20 per cent higher than the white rate, indicating that in epidemic periods Negroes and whites show equal susceptibility to certain of the acute communicable diseases.¹²

Disabling illness rates for specific causes of illness for persons of all ages in the combined population of the four cities are shown in Figure 7.¹³ Comparable disability rates for certain of these causes are shown in Appendix Table 2. The excess observed in the disabling illness rate for tonsillitis among Negroes, and their lower rate for tonsillectomy is of interest, the latter suggesting the effect of the low economic status of the Negro on his ability to obtain specialized surgical treatment. The frequency rate for each of the acute communicable diseases of childhood except diphtheria is found to be lower among Negroes in the combined experience of the four cities, the effect of the higher rates for infectious diseases among Negroes in Cincinnati and Newark being offset by the lower rates observed in Atlanta and Dallas. The excess in the Negro rate for diphtheria is based on a comparison of rates, the difference between which is not statistically significant. The excess observed

¹² The disabling illness rate for measles among Negroes surveyed in Newark was 14.0 per 1,000, compared with a rate of 13.8 for the white surveyed group. Mumps, which also showed a relatively high prevalence in Newark in 1935 and 1936, showed a disabling illness rate for surveyed Negroes of 4.5 per 1,000, the white rate being 2.5.

¹³ In Figure 7, all disabling illness rates shown are determined by specific diagnosis. Thus, the combined rate for the specific acute diseases of the respiratory system as presented in this figure necessarily differs from the rate for the acute respiratory disease group shown in Table 11 because of the difference in method of classification. The combined rate for the specific acute digestive diseases in Figure 7 likewise differs from the rate for the acute digestive disease group shown in Table 11. Discrepancies of a similar nature will be observed in the rate for "other chronic respiratory diseases" in Figure 7, and the rate for "other chronic respiratory diseases" as shown in Appendix Table 2.

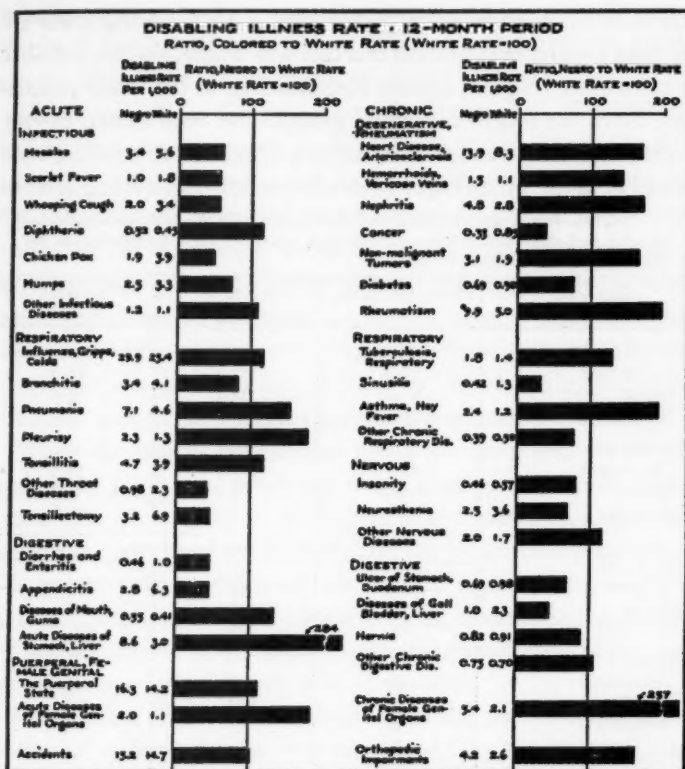


Fig. 7. Comparison of Negro and white annual rate of disabling illness for specific causes. Four large cities surveyed in the winter of 1935-1936 as part of the National Health Survey.

in the Negro rates for the group of chronic diseases is seen to be due largely to the higher rates for the cardiovascular-renal diseases, rheumatism, asthma and hay fever, and the chronic diseases of the female genital organs.

THE ASSOCIATION BETWEEN ILLNESS AND ECONOMIC STATUS

In the experience of the four surveyed cities, it was found that the average Negro suffered a larger amount of disability in the survey

year than the average white person, this relation arising from the fact that the average duration of a case was longer, and the number of cases more frequent among Negroes than in the white population. Since the Negro and white groups have been shown to vary widely in average economic status, it is important to consider such questions as the following: (1) to what extent does a rising level of

Table 12. Frequency, disability, and severity rates for the four surveyed cities by color and relief status, with corresponding ratios of Negro to white rates for Atlanta, Cincinnati, Dallas, Newark.

CITY AND RELIEF STATUS	DISABLING ILLNESS RATE ¹	DISABILITY RATE ²	SEVERITY RATE ³
Four Cities—Negro			
All Incomes	183.2	12.6	69.0
Relief	224.0	17.7	79.1
Nonrelief	153.9	9.0	58.4
Four Cities—White			
All Incomes	163.3	8.9	54.3
Relief	242.7	16.1	66.5
Nonrelief	148.9	7.5	50.6
RATIO (WHITE RATE=100)			
Four Cities			
All Incomes	112	143	127
Relief	92	110	119
Nonrelief	103	119	115
Atlanta			
All Incomes	97	131	135
Relief	85	111	130
Nonrelief	94	107	114
Cincinnati			
All Incomes	134	146	109
Relief	102	93	92
Nonrelief	119	134	112
Dallas			
All Incomes	103	108	105
Relief	87	75	86
Nonrelief	100	107	108
Newark			
All Incomes	115	140	112
Relief	101	103	102
Nonrelief	107	105	99

¹ See Footnote 2, Table 7.

² See Footnote 3, Table 7.

³ See Footnote 4, Table 7.

income increase the Negro's health status; and (2) does the excess observed for certain measures of illness among Negroes persist among Negro and white groups of similar income classes?

Data available for this report permit classification of the Negro and white surveyed groups by dependency status only (i.e., relief, nonrelief) rather than income, which invalidates to some extent the comparison of nonrelief Negro and white groups, the average income of the latter being obviously higher. The various measures of illness specific for relief status indicate that Negroes in the combined population of the cities do, in fact, show a relief-nonrelief differential of the same general tendency as the whites, the disabling illness rate, the disability rate, and the severity rate being higher in the relief than in the nonrelief groups of both races (Table 12).

When the various measures of illness are compared for Negro and white groups on relief, the excess observed in the disabling illness rate of Negroes of all income classes disappears, the rate being 8 per cent lower than the rate for the white relief population. The excess in the disability rate for Negroes persists, but is reduced in magnitude, an excess of 43 per cent being observed in the disability rate of Negroes of all income classes, the excess being 10 per cent for Negroes, compared with whites, on relief.

Considering the ratios of Negro to white rates for the relief groups of individual cities, it is of interest that in Cincinnati and Dallas the disability rates of Negroes on relief were somewhat lower than those for the whites of similar dependency status.

Thus when the variability arising from differences in economic level is eliminated in the comparison of the two racial groups in these surveyed cities, it is found that differences in standard of living account in part for the higher disability rate of Negroes.

SUMMARY

The following broad conclusions may be drawn from a comparison of Negro and white illness rates in a sample population of 30,652 Negroes and 140,263 white persons in four large cities can-

vassed in the National Health Survey made during 1935-1936:

1. In the twelve-month survey period, the amount of disability per person due to illnesses which incapacitated for a week or longer was 43 per cent higher in the Negro than in the white population.

2. The higher disability rate for Negroes is due chiefly to the chronic diseases, which disabled the average Negro eight days per year, compared with five days, for the average white person.

3. Among Negro children under 15 years of age, the frequency of disabling illness was lower than among white children, due to the average lower incidence of infectious and acute respiratory diseases among Negro children. However, Negro children exposed to certain acute communicable diseases in epidemic form in two of the surveyed cities showed disabling illness rates approximating those for white children.

4. Among adults, consistently higher disabling illness rates for Negroes were observed for all disease groups. Considering specific causes of illness, pneumonia was found to be almost twice as frequent among Negroes as among whites; and Negro rates for certain chronic diseases—the cardiovascular-renal group, rheumatism, asthma and hay fever, nonmalignant tumors—were notably higher than the white.

5. The improvement in standard of living which is associated with a rising income increased the health status of the Negro as measured by the various indices of illness, the average Negro in the nonrelief class experiencing only one-half as much disability per year as the average Negro on relief. Low economic status, rather than inherent racial characteristics in the reaction to disease, thus appears to account in large measure for the higher disability rate observed among Negroes. From this fact it follows that the health problems of Negroes are more serious than those of the average white population since they represent in the mass a low-income group, unleavened, as in the white population, by any considerable number in the higher income range.

	ALL AGES	AGE GROUP										No. SICK ALL AGES
		0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-64	65 & OVER		
		PERSONS SICK ON THE DAY OF THE CANVASS PER 1,000 PERSONS										
All Causes												
Males												
Negro	50.1	37.2	28.5	16.5	24.6	30.3	33.8	57.4	96.8	190.9	685	
White	41.3	45.3	51.1	31.6	24.3	19.1	22.1	34.3	58.5	127.7	2,776	
Females												
Negro	66.8	32.0	26.0	19.0	37.4	65.0	67.4	86.4	105.3	208.3	1,134	
White	49.0	42.0	59.1	36.1	31.3	32.1	38.3	47.2	61.6	113.2	3,579	
Acute ¹												
Males												
Negro	31.1	34.1	19.9	12.2	18.0	23.3	19.4	21.8	20.2	28.6	288	
White	21.3	41.3	45.6	24.9	16.7	10.5	12.5	14.1	19.6	31.2	1,429	
Females												
Negro	36.7	20.3	21.1	15.1	24.8	44.3	46.6	44.6	41.6	55.1	623	
White	31.0	39.1	54.7	30.7	23.0	23.4	26.3	27.8	30.6	40.5	2,261	
Chronic ²												
Males												
Negro	29.1	3.3	8.5	4.3	6.6	16.5	14.4	35.6	76.6	162.3	397	
White	20.0	4.0	5.5	6.7	7.5	8.6	9.6	20.2	38.8	96.5	1,347	
Females												
Negro	30.1	1.6	4.9	3.9	12.7	21.6	20.8	41.8	63.6	153.2	511	
White	12.1	3.0	4.4	5.4	8.3	8.7	12.1	19.3	31.1	72.8	1,318	
DISABLING ILLNESS RATE PER 1,000 PERSONS TWELVE-MONTH PERIOD											NUMBER OF DIS- ABLING ILLNESSES ALL AGES	
All Causes												
Males												
Negro	140.3	149.8	136.6	79.7	69.7	101.1	110.3	159.3	212.4	329.4	1,918	
White	141.9	227.9	269.6	125.8	97.3	82.1	86.9	114.4	149.8	262.9	9,542	
Females												
Negro	217.6	144.7	135.8	107.9	174.5	239.7	237.1	267.2	261.2	368.3	3,696	
White	183.0	216.7	270.5	126.6	124.7	104.6	200.3	156.5	166.9	257.5	13,360	
Acute ¹												
Males												
Negro	89.1	138.7	123.0	70.4	53.3	72.9	80.3	89.9	87.9	88.3	1,218	
White	101.0	214.7	251.4	111.3	80.1	61.7	64.7	72.9	74.3	91.4	6,794	
Females												
Negro	146.0	131.7	126.0	91.3	145.3	191.3	167.6	153.6	130.2	130.8	2,479	
White	134.5	204.7	256.3	112.3	104.8	167.2	156.0	99.3	87.2	110.2	9,822	
Chronic ²												
Males												
Negro	51.3	11.1	13.5	9.3	16.4	28.2	30.1	69.4	124.5	241.1	700	
White	40.9	13.3	18.3	14.6	17.0	20.5	22.1	41.5	75.5	171.6	2,748	
Females												
Negro	71.7	13.0	9.9	15.8	29.2	48.4	69.6	113.6	131.0	237.5	1,917	
White	48.5	12.0	14.4	13.3	19.9	27.4	44.3	57.1	79.6	147.4	3,538	
Population											UNKNOWN AGE	
Males												
Negro	13,667	1,562	1,406	1,302	1,220	1,059	2,429	2,335	2,128	419	47	
White	67,252	4,779	5,641	6,303	6,109	5,722	11,293	10,813	13,241	3,305	53	
Females												
Negro	16,985	1,220	1,421	1,523	1,576	1,715	3,652	2,871	2,358	581	58	
White	73,011	4,735	5,504	6,313	6,382	6,789	13,279	11,537	14,076	4,275	121	

¹ Disease symptoms less than three months in duration, see footnote 10.² Disease symptoms three months or longer in duration, see footnote 10.

Appendix Table 1. Prevalence and disabling illness rates by age, sex, and color, for all causes, and for illness broadly classified as "acute"¹ and "chronic"²—surveyed population of four cities (Atlanta, Cincinnati, Dallas, and Newark).

Appendix Table 2. Frequency and disability rates for Negro and white populations surveyed in four cities
(Atlanta, Cincinnati, Dallas, and Newark).

DIAGNOSES	DISABLING ILLNESS RATE—PER 1,000 ¹						DISABILITY RATE—PER PERSON ²					
	All Ages		Under 15 Years		15 Years and Over ³		All Ages		Under 15 Years		15 Years and Over ⁴	
	Negro	White	Negro	White	Negro	White	Negro	White	Negro	White	Negro	White
ALL CAUSES	183.15	163.28	124.61	201.86	204.66	151.30	12.63	8.85	3.83	5.37	12.84	9.97
Infectious	14.91	21.50	42.51	75.70	4.77	4.64	.40	.55	.04	1.72	.20	.19
Pneumonia	7.08	4.58	8.99	8.96	6.38	3.22	.37	.17	.20	.32	.26	.12
Other Acute Respiratory	43.33	43.49	42.36	68.40	43.76	31.78	.73	.65	.55	.88	.56	.57
Appendicitis	2.81	6.30	1.21	4.93	3.39	6.73	.13	.25	.05	.17	.17	.28
Other Acute Digestive	8.09	3.99	2.79	4.43	10.94	3.86	.19	.09	.05	.08	.25	.09
The Puerperal State	16.31	14.20	.12	.06	22.26	18.58	.44	.36	0	0	.60	.47
Acute Diseases of												
Female Genital Organs	1.99	1.67	—	.12	2.72	1.36	.05	.03	—	0	.07	.04
Accidents	15.20	14.69	6.68	11.00	18.33	12.34	.75	.64	.23	.34	.94	.74
Chronic: Total	59.54	41.31	10.20	11.37	77.66	50.61	8.21	5.19	1.32	1.10	10.75	6.46
Respiratory Tuberculosis	1.76	1.35	.85	.39	2.10	1.65	.38	.36	.16	.08	.46	.44
Asthma, Hay Fever	2.28	1.23	2.19	.96	2.45	1.32	.20	.11	.15	.05	.21	.13
Other Chronic Respiratory	1.83	2.16	.40	1.11	2.32	2.49	.25	.18	0	.05	.30	.22
Chronic Digestive Diseases	4.80	5.29	.36	.84	6.42	6.68	.64	.52	0	.05	.88	.67
Neurasthenia	2.51	3.57	—	.42	3.43	4.55	.26	.42	—	.04	.35	.53
Insanity and Other Nervous	2.45	2.27	2.19	2.54	2.30	2.58	.58	.58	.28	.34	.69	.65
Cardiovascular-Renal	18.69	11.05	1.09	2.55	25.16	13.68	2.49	1.13	.12	.16	3.36	1.44
Hemorrhoids, Varicose Veins	1.50	1.66	.12	.03	2.01	1.38	.15	.06	0	0	.20	.08
Cancer	6.33	0.85	.12	—	.40	1.11	.07	.11	0	—	.09	.14
Nonmalignant Tumors	3.13	1.90	.12	.42	4.24	2.36	.34	.13	0	.02	.47	.16
Diabetes	0.69	0.90	—	.15	.04	1.13	.14	.13	—	.02	.19	.16
Rheumatism	9.85	4.99	1.09	1.35	13.07	6.12	.97	.50	.03	.08	1.31	.63
Chronic Diseases of												
Female Genital Organs	5.35	2.08	.24	.03	7.23	2.72	.34	.18	0	0	.46	.34
Orthopedic Impairments	4.24	2.60	1.34	.96	5.31	3.11	1.41	.78	.46	.19	1.76	.96
All Other Causes	13.47	12.13	9.84	16.83	15.34	10.67	1.43	.92	.40	.65	1.81	1.01

¹ Less than five cases.

² The rate of occurrence, in a twelve-month period, of illnesses disabling for seven consecutive days or longer. In this calculation, the rate of occurrence of all illnesses, hospital and non-hospital, is included. The rate of occurrence of all illnesses is used in the sense of inability to work or pursue usual activities.

³ The days of disability per person, in a twelve-month period, arising from illnesses as defined in (2) above.

⁴ Excludes a small number of unknown ages.

Appendix Table 3. Disability, severity, and frequency ratios of Negro to white rates by cause for broad disease groups, for Atlanta, Cincinnati, Dallas, Newark, and the four cities combined.

CITY	ALL CAUSES	INFECTIOUS DISEASES	ACUTE RESPIRATORY DISEASES	ACUTE DIGESTIVE DISEASES	PUERPERAL AND ACUTE FEMALE GENITAL DISEASES	ACCIDENTS	CHRONIC DISEASES ¹	ALL OTHER CAUSES
DISABILITY RATIO—WHITE RATE = 100								
FOUR CITIES	143	73	123	97	(a) 126 (b) 117	117	158	155
Atlanta	131	58	109	64	101	95	101	145
Cincinnati	146	120	130	127	136	133	122	160
Dallas	108	66	108	121	88	84	132	106
Newark	140	92	128	114	146	142	138	142
SEVERITY RATIO—WHITE RATE = 100								
FOUR CITIES	127	105	118	90	104	104	112	110
Atlanta	134	113	132	81	90	90	128	109
Cincinnati	109	90	102	95	125	125	98	99
Dallas	105	143	96	94	86	86	128	96
Newark	112	88	112	93	101	101	98	103
DISABLING ILLNESS RATIO—WHITE RATE = 100								
FOUR CITIES	112	69	105	106	120	113	104	144
Atlanta	97	52	82	79	113	105	79	134
Cincinnati	134	132	127	133	109	106	124	162
Dallas	103	46	113	129	102	96	103	110
Newark	125	105	115	123	145	141	141	138

^a Ratios based on rates per 1,000 total persons.

^b Ratios based on rates per 1,000 females.

¹ For the diseases included in this group, see Appendix Table 2.

Appendix Table 4. Percentage distribution of the surveyed population of Atlanta, Cincinnati, Dallas, Newark, by color according to relief status and family income during the twelve-month period prior to the survey date, 1935-1936.

RELIEF STATUS AND FAMILY INCOME	ATLANTA		CINCINNATI		DALLAS		NEWARK	
	Negro	White	Negro	White	Negro	White	Negro	White
PERCENTAGE DISTRIBUTION								
ALL INCOMES	100	100	100	100	100	100	100	100
Under \$1,000	93	36	88	38	88	33	75	30
Relief	36	17	61	27	25	8	57	18
Nonrelief	57	19	27	21	63	25	18	12
\$1,000-\$1,999	5	34	10	39	9	42	22	42
\$2,000-\$2,999	.4	15	.9	12	1	14	2	17
\$3,000 and Over	.1	9	.4	9	.5	8	1	10
Income Unknown	1	6	.7	2	1	3	.4	.9

is used in the sense of inability to work or pursue usual activities.
 * Includes a small number of unknown age.

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VARIATIONS IN BIRTH RATES ACCORDING TO OCCUPATIONAL STATUS, FAMILY INCOME, AND EDUCATIONAL ATTAINMENT¹

by CLYDE V. KISER²

WITH but little interruption, the birth rate in this country has declined sharply during the past fifteen years. Family incomes were drastically reduced after the economic debacle of 1929. Have the dual influences of declining birth rates and declining income tended to alter in any way the pattern of socio-economic variations in birth rates among representative urban groups? Data bearing on this question are not available from official sources, but some relevant preliminary material is now obtainable from a comprehensive health survey.

During the latter part of 1935 and early part of 1936 the United States Public Health Service, with funds from the Works Progress Administration, conducted the field work for the National Health Survey. The chief object of the investigation was to secure comprehensive data concerning incidence and severity of illness in various elements of urban populations.³ Detailed records were secured from a total of 740,000 families residing in eighty-four cities of nineteen states. In addition to the quantity of material collected, a valuable feature of the survey was its inclusion of all classes of people. It was by no means confined to poorer sections of cities.⁴

¹ A preliminary report based upon National Health Survey data for 16,831 native-white married women of childbearing age in five selected cities. The author wishes to express his gratitude to the United States Public Health Service for its cooperation in making these data available. He wishes to thank Mr. G. St.J. Perrott and Mr. Clark Tibbitts for their suggestions during the preparation of this report.

² From the Milbank Memorial Fund.

³ Further details of the survey may be found in a preliminary report, Perrott, G. St.J. and Holland, D. F.: Chronic Disease and Gross Impairments in a Northern Industrial Community. *Journal of the American Medical Association*, May 29, 1937, 108, No. 22, pp. 1876-1886.

⁴ A valuable study of depression differentials in fertility among residents of poor areas in selected cities was made on the basis of "Health and Depression" data collected in 1933.

(Continued on page 40)

Complete enumeration was attempted in all except one of the surveyed cities under 100,000 population. In larger surveyed cities, including those considered here, the sampling procedure was planned to yield representatives from all groups or strata.⁵

In addition to items on morbidity the schedules used in the enumeration provided excellent data concerning number of live births to surveyed women during the twelve months preceding enumeration. Hence, it was possible to compute annual birth rates, approximately as of the year 1935, among groups classified with respect to selected socio-economic attributes. It is regrettable that facts were not secured concerning the total number of children ever born to married women. Annual rates, however, are more sensitive to current conditions than are rates based upon the total number of children born. Since rural migrants are also encountered in urban populations, and are probably not represented equally in the various socio-economic classes, for present purposes the annual rate has distinct advantages over one based upon total past fertility.

The present report is preliminary in nature. It is confined to the five cities listed in Table 1, and in the main is restricted to the 16,831 women 15-44 years of age who were native white and living with husbands of similar nativity at the time of the enumeration. The major purpose of the report is to examine the variations in birth rates among these women with respect to occupational class of husband, family income, and educational status of husbands and wives. More limited data concerning variations according to nativity and color will also be presented.

See Griffin, Helen C. and Perrott, G. St.J.: Urban Differential Fertility during the Depression. The Milbank Memorial Fund Quarterly, January, 1937, xv, No. 1, pp. 75-89.

⁵In Oakland the survey was planned to include one-eleventh of the households; in Newark, one-eighth; in Grand Rapids, one-ninth; in St. Paul, one-seventh; and in Fall River, one-third. Census Enumeration Districts were used as bases for selection of areas in sampled cities. The Enumeration Districts, or approximately equal portions of them, were listed in serial order, and random selection was made by application of the predetermined sampling ratio, i.e., by selecting every third or fourth unit. Areas thus chosen were scheduled for complete enumeration. Continued re-visits and evening calls were made to avoid the potential bias inherent in missing families in which the wife worked or was away from home at the time of the first visit.

CITY	TOTAL	WHITE			NEGRO	OTHER OR UNKNOWN
		Nativity Head and Wife				
		Both Native	Both Foreign	Dissimilar		
TOTAL	26,176	16,831	3,783	4,311	1,150	101
Oakland	3,936	2,929	301	558	105	43
Newark	7,866	3,491	1,943	1,459	968	5
Grand Rapids	2,574	1,990	221	341	21	1
St. Paul	6,772	5,549	375	758	39	51
Fall River	5,028	2,872	943	1,195	17	1

Table 1. Number of married women 15-44 years of age in Health Survey samples for five cities, by color and nativity. Nativity grouping applies only to whites and refers jointly to heads and wives.

It is believed that virtually complete enumeration was attained for births within the year to women included in the survey. Two unrelated parts of the schedule were designed to elicit such information. In the first place, if a birth occurred to any woman of the household, it was shown in the record of her illness during the year. Quite detailed data were secured for all illnesses which disabled the individual for seven days or longer. In the case of illness due to childbirth, provisions were made for recording type of birth, such as one live birth, one stillbirth, live-born twins, etc. Also, such births were identifiable from the family roster. Enumerators were required to state ages of infants in terms of months, and to include all individuals who had lived in the household during the past twelve months regardless of whether such persons were deceased or away from the household at the time of the enumeration. The editors of schedules in each local office were instructed to examine the roster and illness data for consistency of the above returns. Inconsistent schedules were returned to the enumerators for re-visits.

When the total numbers of live births⁶ enumerated are related with the surveyed populations in the five cities considered here,

⁶ In this instance only, the numbers related to confinements resulting in one or more live births. Twins and triplets appear as one birth. For all remaining rates, referring to married women of childbearing age, the data have been analyzed completely with respect to type of issue.

crude birth rates of the following orders were secured: Oakland, 12.1; Newark, 13.6; Grand Rapids, 14.3; St. Paul, 13.8; and Fall River, 14.5. These figures are equivalent to resident birth rates for the respective cities. In 1935, the crude rate for the total rural and urban population of this country was 16.9.⁷ On the basis of this rate for the total United States, the computed birth rates among residents of cities of the above type would appear to signify reasonably complete enumeration of births. The low-ranking position of Oakland is consistent with the generally low birth rates of California cities. If there was under-enumeration it would seem to have been too small to have bearing on the present analysis of internal variations.

BIRTH RATES BY NATIVITY AND COLOR

For reasons to be presented later, the data for native-white marriages in the five cities were combined. Since Negroes appeared in substantial numbers in only one of the cities considered here, and foreign-white marriages in only two cities, the comparisons of birth rates by color and nativity must be made for such cities separately.

The Newark and Fall River samples afforded good and substantial evidence that by 1935 the birth rates among foreign-white marriages were no higher than those among comparable native-white marriages. Due to the very small numbers of foreign-white wives under 25 years old, a comparison presented in Table 2 is in the form of standardized rates per 1,000 married women 25-44 years of age.⁸ For Newark this rate was 71 per 1,000 native-white wives and 75 among foreign-white wives. In Fall River the rates were 98 and 97, respectively. The picture is not changed substantially

⁷ Bureau of the Census, *Vital Statistics, Special Reports*. Washington, Department of Commerce, January 19, 1937, iii, No. 1, p. 1.

⁸ Standardized by applying the age distribution of all married females, 25-44 years of age, in the United States, as computed from the 1930 Census. The standardized rate for this age range was used only for comparisons by nativity and color. See footnote 10.

AGE OF WIVES, NATIVITY, AND COLOR	BIRTHS PER 1,000 WIVES			
	All Classes		Laboring Classes	
	Newark	Fall River	Newark	Fall River
25-44				
Native-White	71	98	78	96
Foreign-White	75	97	77	89
Negro	52	—	57	—
15-44				
Native-White	104	—	115	—
Negro	93	—	95	—
NUMBER OF WIVES				
25-44				
Native-White	2,883	2,348	1,523	1,563
Foreign-White	1,890	923	1,301	775
Negro	805	—	728	—
15-44				
Native-White	3,491	2,872	1,902	—
Foreign-White	1,943	943	1,342	—
Negro	968	—	869	—

Table 2. Comparison of standardized birth rates among native-white, foreign-white and Negro marriages in Newark and Fall River. Data are classified with reference to age of wife, and in section at right are restricted to laboring classes.

when the comparison by nativity is restricted to wives of laborers in similar age groups.

Negro-white comparisons are available only from the Newark data. In that city birth rates among Negro wives, especially those 25-44, were considerably lower than among native-white marriages in which the ages of the wives and occupational class were comparable. The total standardized birth rate for women in the complete childbearing span, 15-44, was about 12 per cent higher in native-white marriages than in Negro unions. This total, however, disregards the differences in social class composition and conceals significant variations by age. Native-white wives in the laboring class, and 15-24 years of age, were only 4 per cent more fertile in 1935 than were Negro wives of similar age and station. On the

other hand, native-white wives 25-44 were about 38 per cent more fertile in that year than were comparable groups of Negro wives. One must remember, of course, that in the above comparisons we are dealing with birth rates among married women and that rates of illegitimacy are relatively high among Negroes. Whatever alterations that factor would produce, the outstanding results of these comparisons are that birth rates among Negro marriages in a northern industrial city were lower than those found among comparable native-white marriages and that the current birth rates of foreign whites in two cities were no higher than those of native whites.

COMBINATION OF DATA FOR NATIVE-WHITE MARRIAGES

As previously stated, the major emphasis of this preliminary report is upon socio-economic variations in birth rates among native-white unions. Specifically, these variations will be examined with reference to occupational class of the head, family income and relief status, and educational attainment of the head and wife. In the interest of maintaining sufficiently substantial numbers to yield reliable birth rates in the desired subdivisions of data, tests were made to ascertain the validity of combining the native-white samples in the several cities.⁹

The standardized¹⁰ birth rate per 1,000 women of childbearing age (all occupational classes combined) was found to be 76.9 in Oakland, 103.9 in Newark, 105.5 in Grand Rapids, 115.6 in St. Paul, and 126.1 in Fall River. When the two predominant occupational classes are separately considered, Oakland still ranked significantly lower than the other cities but there were no significant differences between the remaining four cities.¹¹ On the basis of this situation

⁹ See Table 1 for distribution by city of the 16,831 native-white marriages in the surveys.

¹⁰ Standardized by applying the age distribution of all married females 15-44 in the United States, as computed from the 1930 Census reports.

¹¹ The following indicates the significant differences observed between Oakland and
(Continued on page 45)

it would appear that for the present purpose the samples for Newark, Grand Rapids, St. Paul, and Fall River might justifiably be combined, and that Oakland should be handled separately. This procedure was in fact originally carried out, but actual experimentation demonstrated that the inclusion of Oakland with the remaining cities did not change the essential pattern of the variations whatsoever, and served merely to lower all rates somewhat. All samples were therefore combined for the present report. In presenting the material, mention will be given of any important deviations by specific cities from the general pattern of variations in birth rates.

BIRTH RATES BY OCCUPATIONAL CLASS OF HEAD¹³

If the preliminary findings presented are borne out by the complete survey, there may be emerging an interesting deviation from the traditional pattern of inverse association between birth rates and occupational status. In the combined samples for five cities, Table 3 and Figure 1, the lowest birth rate was not found among wives of professional men, but among those of business men, and more specifically among those of proprietors. This situation held true in three of the cities considered separately.

Newark, the latter city showing next lowest rates. No significant difference is shown between Newark and Fall River, the latter city exhibiting highest rates.

OCCUPATION OF HEAD	NUMBER WIVES 15-44			STANDARDIZED RATE PER 1,000 WIVES			DIFFERENCE \pm P.E.	
	Oak- land	Newark	Fall River	Oak- land	Newark	Fall River	Oakland- Newark	Newark- Fall River
Business Skilled	1,265	1,286	723	65.1	93.1	106.8	28.0 \pm 7.2	13.7 \pm 9.4
	1,212	1,670	1,765	79.1	110.6	121.3	31.5 \pm 7.6	10.7 \pm 7.4

¹³ The punch card for each person in the survey includes in the family data the occupational class of the head. The head is always the husband of the married woman considered except in cases typified by a married daughter living with her parents. Since the data are confined to unbroken unions, such cases are few.

For coding occupational classes, the 1930 Census occupational manual was used in connection with Edwards' classification. See Edwards, Alba M.: A Social Economic Grouping of the Gainful Workers of the United States. *The Journal of the American Statistical Association*, December, 1933, xxviii, No. 184, pp. 377-387.

OCCUPATIONAL CLASS OF HEAD	LIVE BIRTHS PER 1,000 WIVES, BY AGE					
	Total 15-44 Standardized	15-24	25-29	30-34	35-39	40-44
Professional	101	175	141	94	67	15
Business	93	184	133	89	37	8
<i>Proprietors</i>	85					
<i>Clerks-Salesmen</i>	96					
Skilled and Semi-Skilled	111	241	134	95	53	15
<i>Skilled Workers</i>	101					
<i>Semi-Skilled—not in M'fg.</i>	110					
<i>Semi-Skilled in M'fg.</i>	122					
Unskilled	137	271	170	131	81	14
NUMBER OF WIVES						
Professional	1,113	103	289	267	255	199
Business	6,281	761	1,428	1,414	1,389	1,289
<i>Proprietors</i>	2,207					
<i>Clerks-Salesmen</i>	4,074					
Skilled and Semi-Skilled	8,059	1,447	1,859	1,812	1,622	1,319
<i>Skilled Workers</i>	3,689					
<i>Semi-Skilled—not in M'fg.</i>	2,009					
<i>Semi-Skilled in M'fg.</i>	2,361					
Unskilled	1,051	269	253	183	207	139

Table 3. Birth rates in 1935 among native-white marriages, grouped according to usual occupational class of the household-head, and by age of wife. Samples from five cities combined.

Aside from the above departure, the traditional ranking of the classes with respect to birth rates was maintained. When the broader groupings are considered, the standardized rates extended from 93 births per 1,000 wives 15-44 years of age in the business class to 137 among unskilled laborers, with the intermediate range of 112 for all skilled and semi-skilled workers combined. Perhaps the point of chief interest revealed by the more detailed division is the higher rate among semi-skilled workers in manufacturing than among semi-skilled workers outside of factories. This type of comparison was observed in each of the five cities considered separately.

The age-specific rates, shown in Table 3 and Figure 2 for the four broad classes in the five cities combined, indicate several points of

interest. Occupational differences in birth rates during 1935 were greatest among women under 25 years of age. In this age group the lowest rates were observed among wives of professional men, so the previously observed higher average rate shown for the professional class as compared with the business class must be attributed to older wives. Only among wives under 25 was the rate for skilled workers high in comparison with that of the white collar classes. The relatively high level of the rates for unskilled laborers, however, was maintained throughout the 15-40 age range.

In considering the professional-business comparison of birth rates indicated in this sample, one should keep in mind that in previous studies based upon total number of children born the birth rates of professional families have been only a little lower than those of families of business status. Larger disparities in birth rates have generally been observed in the comparison of business groups and skilled workers and in the comparison of skilled workers and unskilled laborers. It is possible that the relatively low birth rates for those engaged in business during 1935 was only a temporary situation associated with the depression. Data from further tabulations are awaited with interest to ascertain whether or not there is a recent tendency, general or localized, for birth rates of professional families to surpass those of comparable families of business status.

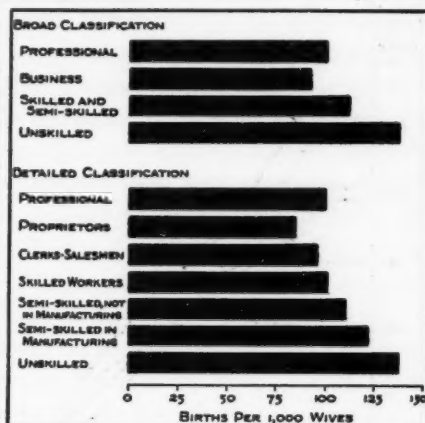


Fig. 1. Standardized birth rates in 1935, according to usual occupational class of the household-head. See Table 3.

Furthermore, since fifteen of the cities included in the Health Survey were also contained in a previous analysis based upon 1910 Census material,¹³ it is hoped that eventual comparisons of the

early and recent data may afford some valid indications as to diminution or increase of socio-economic differences in fertility.

FAMILY INCOME, RELIEF STATUS, AND BIRTH RATES

The forms used in the survey provided for data concerning the total family income during the year preceding enumeration. The information was not recorded in specific figures. Instead, it was designated by checking one of

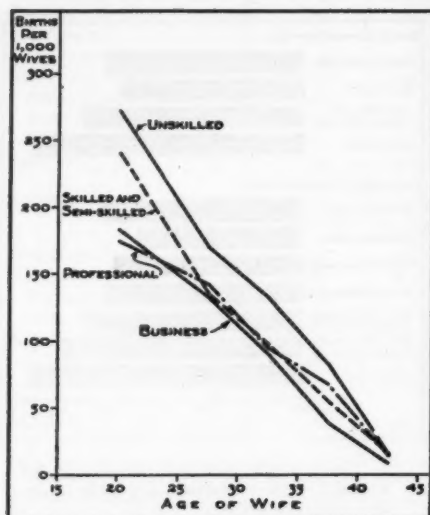


Fig. 2. Births per 1,000 wives in 1935, according to usual occupational class of the household-head, and by age of wife. See Table 3.

six family-income categories ranging from "under \$1,000" to "\$5,000 and over." It was believed that such procedure would minimize opposition to the question from families in higher-salaried classes. Income data were recorded for almost 99 per cent of the native-white families constituting the present sample. The enumerators also asked of each family whether any resident member in the household had received "relief" (including "work relief") during the past twelve months. These data were used for establishing the family income-relief classes employed in this report. For

¹³ Sydenstricker, E. and Notestein, F. W.: Differential Fertility According to Social Class. *The Journal of the American Statistical Association*, March, 1930, xxv, New Series, No. 169, pp. 9-32.

present purposes the "\$3,000-\$4,999" and "\$5,000 and over" groups were combined, due to small numbers of families reporting as much as \$5,000 per year.

In view of certain characteristics of the data, special interest attaches to the relation between family income and birth rates. In this case both variables refer to the year preceding enumeration¹⁴ and the independent variable, income, is itself peculiarly sensitive to depression conditions. In the nature of the case, the advent of a depression brings more immediate and drastic changes in the status of families with respect to income than with respect to "usual" occupational status, and depressions presumably have little bearing on the educational status of husbands and wives. In a sense, therefore, the observed relation of birth rates to family income in a given recent year should be especially sensitive to current conditions.

In the first place, it should be emphasized that birth rates observed among the lowest income groups and relief recipients were markedly high, Table 4 and Figure 3. Equally striking, however, is the unexpected showing made by the families in the highest income group. The birth rate in 1935 among these families was not only higher than that observed among families earning \$2,000-\$2,999,¹⁵ but also surpassed that of families in the \$1,500-\$1,999 group.

If the highest income group is disregarded, the picture for the five cities combined is that of a straight inverse association between income status and birth rates. The birth rate extended from 73 among nonrelief families earning \$2,000-\$2,999 to 154 among relief recipients. The reader is warned, however, against the conclusion that receipt of public relief is conducive to high birth rates. The rate for all families earning under \$1,000, relief and nonrelief, was 137. Students have frequently pointed out that indigent fami-

¹⁴ The income data coincide in time with the birth dates of infants enumerated, and in approximately one-fourth of the cases coincide with the dates of conception.

¹⁵ This situation was observed in three of the cities analyzed separately. The exceptions were Newark and Oakland, but in the latter city the birth rate among families earning \$2,000-\$2,999 surpassed that for families in the immediately lower category.

FAMILY INCOME PER YEAR	LIVE BIRTHS PER 1,000 WIVES, BY AGE					
	Total 15-44 Standardized	15-24	25-29	30-34	35-39	40-44
\$3,000 and Over	88	169	111	98	46	3
2,000-2,999	73	108	116	85	38	7
1,500-1,999	77	129	108	89	42	8
1,000-1,499	94	198	124	84	40	11
Under \$1,000 ¹	137	285	177	110	73	21
All on Relief	154	331	196	113	81	33
	NUMBER OF WIVES					
\$3,000 and Over	1,319	59	207	297	371	385
2,000-2,999	2,375	186	491	565	577	556
1,500-1,999	3,216	356	750	731	745	634
1,000-1,499	4,078	701	1,033	913	817	614
Under \$1,000 ¹	5,428	1,303	1,335	1,124	948	718
All on Relief ²	2,889	641	649	636	543	410

¹ Includes 2,661 families on relief and 2,767 nonrelief families. Specific income categories above \$1,000 include no relief families.

² Includes 2,661 families earning under \$1,000 and 228 relief families whose earnings were coded simply as "over \$1,000."

Table 4. Birth rates in 1935 among native-white marriages, grouped according to family income and relief status, and by age of wife. Samples from five cities combined.

lies with an expectant mother or a newly-born child are more

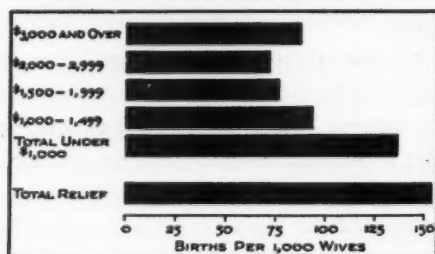


Fig. 3. Standardized birth rates in 1935, according to family income and relief status. See Table 4.

status at specific ages of wives, Table 4 and Figure 4, yield several points of interest. In the first place, the range of variation

likely to apply for and to receive public aid than are other economically marginal families. To some extent, therefore, families are on relief *because* of high birth rates.

The comparisons of birth rates by income

is greatest among wives under 25. Nevertheless, distinctly higher birth rates are observed among the low-income and relief groups of all ages from 15-40. Only a small number of wives under 25 years of age were in the "\$3,000 and over" income group, so the birth rate observed for them is not reliable. This group furnishes the reasonable suggestion, however, that there is less tendency toward postponement of births among young couples in the upper and middle classes if their income is commensurate with their usual standard of living.

BIRTH RATES ACCORDING
TO EDUCATIONAL STATUS
OF THE HEAD AND WIFE

In the nature of the case, educational status of parents is more permanent than family income or type of livelihood. Husbands and wives reporting college training before the depression remain in that classification despite changes in family income or usual occupational status.

As previously noted, the uppermost classes with respect to occupation and income surpassed immediately lower classes in birth rates during 1935. With respect to educational attainments, birth rates among college groups in that year were not higher than, but were as high as, those observed for individuals of high school

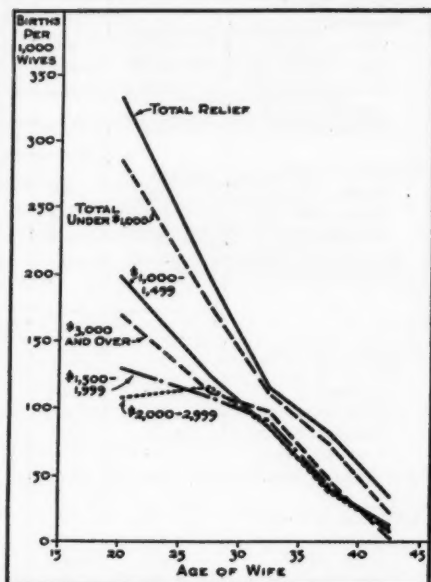


Fig. 4. Births per 1,000 wives in 1935, according to family income and relief status, and by age of wife. See Table 4.

	LIVE BIRTHS PER 1,000 WIVES, BY AGE					
	Total 15-44 Standardized	15-24	25-29	30-34	35-39	40-44
Education Head of Household						
College	99	176	155	102	41	11
High School	99	207	130	85	46	7
Grammar School	116	254	134	99	55	16
7th-8th Grades	112					
Under 7th Grade	133					
Education of Wife						
College	97	156	146	114	39	16
High School	98	216	126	82	44	7
Grammar School	119	248	149	102	57	14
7th-8th Grades	114					
Under 7th Grade	140					
NUMBER OF WIVES						
Education Head of Household						
College	2,620	295	716	597	539	473
High School	6,613	1,246	1,617	1,426	1,287	1,037
Grammar School	7,581	1,122	1,560	1,712	1,704	1,483
7th-8th Grades	6,511					
Under 7th Grade	1,070					
Education of Wife						
College	1,813	173	478	463	380	319
High School	8,013	1,564	2,073	1,714	1,515	1,147
Grammar School	7,002	927	1,345	1,562	1,638	1,530
7th-8th Grades	6,003					
Under 7th Grade	999					

Table 5. Birth rates in 1935 among native-white marriages grouped according to educational attainments of household heads and wives, and by age of wife.

status.¹⁶ This held true regardless of whether the data are grouped by educational status of the head or by education of the wife,¹⁷ Table 5 and Figure 5.

¹⁶ Heads or wives classified as being of "college" status, "high school" status, etc., did not necessarily complete the full training implied by the respective categories. Individuals were coded into the "college" group, for instance, if they reported any college attendance.

¹⁷ The averages for the five cities, however, conceal the variations observed in individual cities. In the classification on the basis of the head's educational status, the birth rates were

(Continued on page 53)

The failure of the college groups to register during 1935 lower birth rates than high school attendants does not represent a substantial deviation from the situation in earlier years. Fairly recent data based upon total number of children born have indicated that the differences between high school and college groups are relatively insignificant compared with those between high school and common school groups.¹⁸ Other investigations confirm the foregoing indications that after high school the factor of continued education, in itself, has little influence upon marital fertility.¹⁹

Aside from the virtual similarity of rates among college and high school groups, the results from the present sample show fairly marked inverse association between birth rates and educational attainment. Wives of college men were characterized by a birth rate 11 per cent lower than that among women whose husbands attained seventh or eighth grade education and about 26 per cent

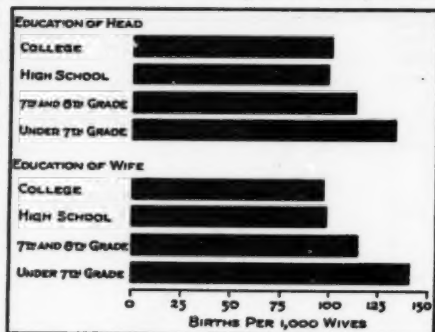


Fig. 5. Standardized birth rates in 1935, according to educational status of the household-head and of the wife. See Table 5.

higher among the "college" groups than among the "high school" groups in two cities (Oakland and Fall River) and were lower than those among "high school" groups in Newark and Grand Rapids. In St. Paul the rates for "college" and "high school" groups were practically identical. In the grouping according to the wife's educational attainment, the birth rates of college-trained women surpassed those of "high school" women in only one city, St. Paul; were lower than "high school" rates in three cities (Newark, Fall River, and Grand Rapids) and similar to the "high school" rate in Oakland.

¹⁸ Notestein, F. W. and Kiser, C. V.: Factors Affecting Variations in Human Fertility. *Social Forces*, October, 1935, xiv, No. 1, pp. 34-35.

¹⁹ Goodsell, W.: The Size of Families of College and Non-College Women. *American Journal of Sociology*, March, 1936, xli, No. 5, pp. 585-597; Smith, Mary Roberts: Statistics of College and Non-College Women. *Quarterly Publications of the American Statistical Association*, 1900, vii, pp. 1-26.

lower than that found for families in which the head's formal education did not extend beyond the sixth grade. The range in variation of birth rates was a little greater when the grouping was

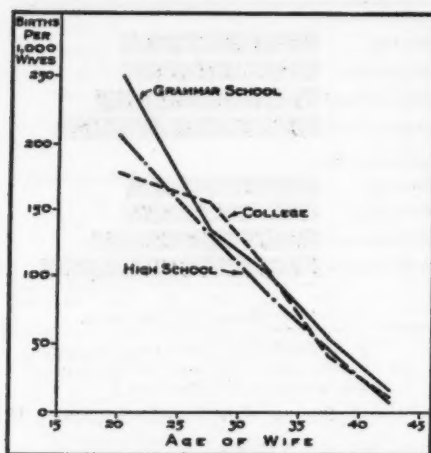


Fig. 6. Births per 1,000 wives in 1935, according to educational status of the household-head, and by age of wife. See Table 5.

In essential respects the age-specific pattern of variation in birth rates by educational status is similar to that previously observed when the data were grouped by occupational class. At ages younger than 25, the college-trained groups ranked lowest in birth rates regardless of whether the education of the head or that of the wife was used as the basis of classification, Figures 6 and 7. A like situation was observed among young wives of professional men, Figure 2. In part, the relatively high ranking of the birth rates of wives in upper classes at ages 25-34 accrue from first births among late marriages. In addition, the situation may reflect the eventuation of postponed births among young couples of college or professional status.

Before closing this report it should be emphasized that the findings presented here are preliminary, not final. More adequate analyses of the bearing of the various socio-economic factors upon

made on the basis of the wife's education, but this increase in range may well be accidental. In the present sample, however, the 1935 birth rate of college-trained wives was about 15 per cent lower than that of women of seventh-eighth grade education, and 31 per cent lower than that of women whose formal learning was confined to the sixth grade or less.

the birth rate must await larger and better controlled masses of data. When these are available, it should be possible, for instance, to determine the relation of income to birth rates among groups homogeneous with respect to educational and occupational levels. Such cross-tabulation demands larger numbers than were available at this time.

SUMMARY

This preliminary analysis of fertility data from the Health Survey is confined to five cities and is restricted mainly to 16,831 native-white unions in which the wives were 15-44 years of age. The birth rates refer to natalities during one year (centering on 1935) among women of childbearing age and were computed according to several separately considered socio-economic attributes. The major preliminary points may be summarized as follows:

1. In Newark, Negro marriages of the laboring class were less fertile than native-white unions comparable with respect to occupational class and age of wife. This disparity arose mainly from the low birth rates of Negro wives over 25 years of age.
2. In Newark and in Fall River the birth rates of foreign-white unions were practically the same as those of native-white unions.
3. With one type of exception, the combined data for native-white unions indicated the existence in 1935 of marked inverse association between birth rates and socio-economic status. This held true re-

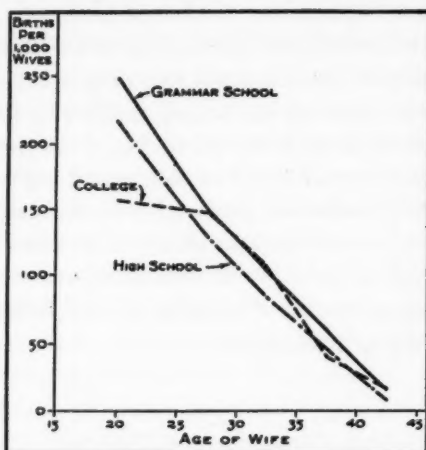


Fig. 7. Births per 1,000 wives in 1935, according to educational status and age of the wife. See Table 5.

ardless of whether the data were grouped according to occupational class of head, family income, education of the head, or education of the wife. The exception consisted in the failure of the top classes to manifest the lowest birth rates. The standardized birth rate for the professional group was a little higher than that for the business class. Grouped according to income, minimum birth rates were observed not among families earning \$3,000 and over, but among those in the \$2,000-\$2,999 category. Practically equal birth rates were observed in college and high school groups, when the classification was made either on the basis of the head's educational status or on the basis of the wife's education. Additional data are required before valid conclusions can be drawn concerning recent enlargement or diminution of class differences in fertility in their more general aspects.

A DEMOGRAPHIC STUDY OF 38,256 RURAL FAMILIES IN CHINA

by FRANK W. NOTESTEIN¹

IT IS no part of the present report to re-estimate the number of China's total population or even the aggregate number of the rural inhabitants with which this study explicitly deals. Various estimates of the total population range from about 350 millions to more than 550 millions. Most observers believe that the rural population constitutes 80 or perhaps even 85 per cent of the total. Wherever the truth may lie, little imagination is required to see that the welfare of these uncounted hundreds of millions is the welfare of China, and that in the small world of modern communications, with its political and economic uncertainties, the welfare of the Chinese farmer is a matter of importance to all of humanity.

It is with the composition, characteristics, and vital processes of this vast population, rather than with its numbers, that the present study deals. On those matters the Population Survey under consideration yields much the most extensive and detailed information thus far available. The survey was conducted with the cooperation of the Milbank Memorial Fund in connection with the China Land Utilization Study under the direction of Professor John Lossing Buck of the University of Nanking. In the present report it is possible only to present in condensed factual manner a summary of some of the more important findings. A more complete analysis will appear as a chapter on population of Professor Buck's report.²

THE SAMPLE

The data for the population study were collected by the investigation of a large number of communities, each selected because it

¹ School of Public Affairs, Princeton University.

² Buck, John Lossing: *LAND UTILIZATION IN CHINA*. To be issued under the auspices of the University of Nanking, The China Institute of Pacific Relations, The National Economic Council, and the Central Bank of China. Agents: The University of Chicago Press, Oxford

(Continued on page 58)

was thought to be typical of its class.³ From each of these communities field investigators were chosen on the recommendation of local leaders. These investigators were carefully trained in the use of the schedules and given field experience under the supervision of a regional investigator. They were then required to secure the necessary data from every family in the areas assigned them. There were 119 such localities, with populations ranging from 396 to 6,260 inhabitants, located in sixteen provinces. Altogether, information was collected and analyzed for 46,601 families. The data obtained related to the status of the population as of an enumeration day and to the events which occurred during a twelve-month period ending with that day. The enumeration day and year varied from place to place, but all of the data were collected in the years 1929 to 1931. In every case an effort was made to have the enumeration day coincide with some festival or other easily remembered time so that the informants would be clear as to the exact period covered.

In spite of the care taken to obtain reliable data, examination of the crude birth and death rates for individual localities showed that a number of them had been inaccurately enumerated. Some of the rates were impossibly low, indicating a failure on the part of certain field workers to record all of the births and deaths, and suggesting the possibility of other inaccuracies less easily detected. Such a finding is not surprising when one considers the obstacles facing the investigation of an illiterate peasant population by enumerators with little experience in making field studies and only a hazy idea of the use to which their reports would be put. The surprising thing is not that the survey was poor in a few areas, but that it was apparently so reliable in the great majority of them.

University Press, and The Commercial Press. This paper, with slight modifications, was presented to the International Population Congress, held in Paris in July, 1937, and will appear in the proceedings of that meeting.

³ The field work and coding were under the supervision of Professor Chi-ming Chiao of the University of Nanking, who also made a preliminary analysis of about one-third of the sample upon which the present study is based. See bibliography reference 5.

In order to secure as accurate information as possible, a somewhat arbitrary procedure was adopted by which the data were rejected for those localities in which it was most obvious that a

substantial proportion of the births and deaths had been omitted. If, after ample allowance was made for the fact that low rates might be due to specific local conditions or to chance errors arising from small numbers, the birth or death rates appeared unbelievably low, all of the data for the locality were rejected.⁴ There were eighteen such areas but, with two exceptions, they were ones



Fig. 1. Location of areas from which data were secured.

enumerated early in the investigation on a schedule form which was later changed. The highest birth and death rates on the basis of which any area was rejected were 20.7 and 10.5 respectively.

This rejection left 101 localities distributed as shown in Figure 1 and Table 1, in which records were secured from an aggregate of

⁴ The actual procedure was to rank the areas which had been enumerated on a revised schedule form in the order of their crude birth and death rates, and to select the first quartile limits. Curves were then plotted which represented these limits minus 3 sigmas for a series of n 's. When either the birth or the death rate of any locality fell below the curves, all of the data for that locality were rejected. A similar test applied to the upper limits would have yielded no rejections except in the case of five localities where there had been epidemics. It should be clearly understood that this procedure resulted in the retention of data for some small localities in which the recorded birth and death rates were lower than those which determined the rejection of data for larger localities. This makes allowance for the fact that the low rates which indicated inaccurate enumeration in large localities may for small samples have reflected simply chance errors.

REGION AND PROVINCE	AREAS SURVEYED	RESIDENT FAMILIES	RESIDENT POPULATION
TOTAL SAMPLE	101	38,256	202,617
North China	44	17,581	97,511
Anhwei	2	718	4,017
Hopoh	11	3,415	20,689
Honan	8	4,603	24,949
Shansi	7	2,741	13,539
Shantung	9	3,197	18,174
Shensi	6	2,706	15,248
Suiyuan	1	201	895
South China	57	20,675	105,106
Anhwei	6	2,830	14,334
Chekiang	7	2,837	12,228
Fukien	3	801	3,922
Hupoh	4	1,728	9,111
Kiangsi	1	616	3,205
Kiangsu	13	5,416	26,970
Kwangtung	3	1,104	7,185
Kweichow	2	1,235	6,271
Szechwan	16	2,872	15,581
Yunnan	2	1,236	6,299

Table 1. Geographic distribution of the sample.

38,256 resident families comprising 202,617 persons resident on the enumeration days and 5,499 who died during the enumeration years. The lowest birth and death rates recorded for any of the 101 localities retained were 10.2 and 9.7 respectively, and for all areas combined the crude birth rate was 38.3 and the crude death rate 27.1. It is probable that even these rates are lower than the actual conditions warranted since all localities were retained whenever it appeared possible that the low rates might be due to sampling errors. Doubtless some of them were actually due to faulty enumeration. Therefore, the remaining data somewhat underestimate the true force of both mortality and fertility and are less than precise in other particulars, but carefully interpreted they afford a much better picture of the composition and vital processes of the rural Chinese population than has hitherto been available.

THE FAMILY

The patriarchal family retains an important place in Chinese rural life, particularly in North China where the means of communication are less developed and prosperous cities, with their disintegrating influence on ancient tradition, are more difficult to reach. In the North, that is in the wheat regions, about one-third of the family members did not belong to the immediate families of the household heads. In the South, that is in the rice and tea regions, these other kin constituted a little over one-quarter of the total. Similar differences existed between the size of families of the two regions. As may be seen from Table 2, the average was about $5\frac{1}{2}$ persons in the North and about 5 persons in the South.

In both the North and the South there was an intimate relation between size of the family and productive capacity of the farms, as measured roughly by crop area. It seemed unwise to examine this relationship by merely classifying all farms with equal crop areas together, because so many different types of agricultural regions were included in the sample. In some regions, where the land was rich and the cultivation intensive, small farms yielded higher incomes than the larger farms of districts with poor soil and semi-arid climate. The difficulty was at least partially avoided by classifying

Table 2. The relation of crop area of the farm to the mean size of family.

CROP AREA OF FARM ¹	MEAN SIZE OF FAMILY			CROP AREA IN HECTARES			
	Total Sample	North China	South China	North China		South China	
				Smallest Farm	Largest Farm	Smallest Farm	Largest Farm
TOTAL	5.21	5.44	5.01	0.01	127.50	0.00	367.50
Group I	3.96	3.98	3.94	0.01	2.24	0.00	1.21
Group II	4.52	4.57	4.48	0.03	3.44	0.06	2.67
Group III	5.02	5.13	4.93	0.05	4.96	0.07	4.19
Group IV	5.76	6.07	5.49	0.08	7.52	0.14	11.03
Group V	7.31	7.92	6.80	0.10	127.50	0.34	367.50
Nonfarm or Crop Area Unknown	4.19	4.72	3.83	—	—	—	—

¹ See text for explanation of crop-area groups.

the size of each farm in relation to that of the farms in its own locality. The families of each of the 101 localities were arranged in order of increasing crop area of their farms. They were then divided into five equal groups, and the corresponding groups of all localities were combined. Group I thus obtained, therefore, included the fifth of all the families which had the smallest farms in their own localities and Group V included the fifth which had the largest farms in their own localities. As may be seen from Table 2, crop areas included in each group vary greatly, but they increase directly from the lowest to the highest group.

The size of family increased sharply with the crop area of the farm thus classified. The average of 3.96 persons per family found on the smallest farms rose to 7.31 persons per family on the largest farms. The relationship was found both in the North and the South although in each group the average number of persons per family was somewhat smaller in the South. This positive association between crop area and size of family indicates simply that most Chinese rural families had about as many members as the farms could support.

AGE AND SEX

DISTRIBUTIONS

In both North and South China, the resident rural population was characterized by a large proportion of males, as may be seen in Table 3. The ratio of 108 males per 100 females was larger than that for any other country listed, but was nearly approached by the ratio for India which was 106. In each case

Table 3. Sex ratio of the population, for various countries.

Country	Year	Males per 100 Females
China (Total Sample)	1929-1931	108
North China	1929-1931	108
South China	1929-1931	109
British India ¹	1931	106
Japan ¹	1930	102
Australia ¹	1931	104
England and Wales ¹	1931	92
Sweden ¹	1930	97
United States		
Total Population ²	1930	103
Rural Population ²	1930	108

¹ See bibliography reference 13, p. 485.

² See bibliography reference 22, pp. 99, 102.

AGE	CHINA (1929-1931)			INDIA ¹ (1931)	JAPAN ² (1925)	ENGLAND AND WALES ³ (1927)	FRANCE ³ (1926)	UNITED STATES ⁴ (1930)	
	Total Sample	North	South					Total	Rural
TOTAL	100.0	100.0	100.0	100.0	99.9	100.0	99.9	100.0	99.9
Under 10	25.0	24.1	25.7	28.5	25.4	16.9	14.8	19.6	22.7
10-19	19.3	19.1	19.4	20.7	21.1	17.7	16.2	19.2	21.5
20-29	17.0	16.7	17.3	18.1	15.8	16.7	16.5	16.9	15.1
30-39	13.8	13.4	14.2	13.9	12.0	14.3	13.9	14.9	12.6
40-49	11.4	12.3	10.6	9.3	10.5	13.2	13.3	12.3	10.9
50+	13.5	14.4	12.8	9.5	15.1	21.2	25.2	17.1	17.1

¹ See bibliography reference 2, Vol. I, Part I—Report, p. 98.

² See bibliography reference 9, p. 16.

³ See bibliography reference 19, p. 98.

⁴ See bibliography reference 22, pp. 577, 588-589.

Table 4. Age distribution of the population, for various countries.

the large proportion of males probably was due in part to the under-enumeration of females. The chief factor, however, was the unfavorable mortality experience of females.

China is spoken of as an old country, and so its culture is. But its population is young, judged by present-day Western standards. (Table 4.) Its youth is, of course, the inevitable result of high birth and death rates. Many are born but few survive the hazards of infancy and childhood. The South, with its higher birth and death rates, has a younger population than the North. The population of India is even younger. Japan, on the other hand, is in a transitional stage. Modern sanitation and medicine are counterbalancing the effect of a somewhat lower fertility, to yield an age distribution not sharply different from that found in China. In a very real sense the East is young.

MARRIAGE

The central fact about marriage in rural China is that virtually every one marries as soon as possible. After age 30 the bachelor is rare and the spinster virtually nonexistent. Monogamy is the rule. In the survey population there were eighty-one wives to each con-

cubine enumerated. China and India lead all the countries listed in Table 5 in the proportion which married persons formed of the population in the important reproductive ages. Among males the proportion married was slightly higher in India, but among the females China was highest with 85 per cent married as against India's 81 per cent. The large proportion of widows in India accounts for the difference. In Japan, on the other hand, only 67

Table 5. Distribution by marital condition of the population 15-44 years of age, for various countries.

SEX AND COUNTRY	TOTAL NUMBER 15-44 YEARS OF AGE	PER CENT				
		Total	Single	Married	Widowed	Divorced
MALE						
China (Total Sample) (1929-1931) ¹	46,434	100.0	28.3	68.1	3.5	0.1
North China	21,560	100.0	28.9	67.7	3.3	0.1
South China	24,874	99.9	27.8	68.4	3.6	0.1
India (1931) ²		100.0	23.2	72.0	4.8 ²	—
Japan (1925) ³		99.9	42.6	54.5	1.2	1.6
England and Wales (1921) ⁴		100.0	50.4	48.6	0.9	0.1
France (1926) ⁴		99.9	46.3	52.1	1.0	0.5
United States (1930) ⁵						
Total		99.9	45.9	52.0	1.1	0.9
Rural		100.0	47.8	50.3	1.2	0.7
FEMALE						
China (Total Sample) (1929-1931) ¹	42,438	99.9	10.5	84.8	4.6	0.0
North China	19,801	100.0	9.8	85.5	4.7	0.0
South China	22,637	100.0	11.2	84.2	4.6	0.0
India (1931) ²		100.0	5.4	80.7	13.9 ²	—
Japan (1925) ³		100.1	28.0	66.7	3.1	2.3
England and Wales (1921) ⁴		100.0	48.4	48.5	3.0	0.1
France (1926) ⁴		100.0	37.6	57.1	4.5	0.8
United States (1930) ⁵						
Total		100.1	34.6	61.1	3.0	1.4
Rural		100.0	32.7	63.9	2.5	0.9

¹ Exclusive of Cheng, Honan Province (North China) and Tehtsing, Chekiang Province (South China), where data relating to marital condition were not collected.

² See bibliography reference 2, Vol. I, Part II, Imperial Tables, p. 120 (Divorced included with widowed).

³ See bibliography reference 9, pp. 16-17.

⁴ See bibliography reference 19, p. 104.

⁵ See bibliography reference 22, pp. 843, 848; (Persons of unknown marital condition not included).

per cent of the women of childbearing age were married and in the West the proportions were still lower. The unusual prevalence of marriage in the Indian and Chinese populations is obviously an

Table 6. Mean age at marriage of all persons contracting marriage, for various countries.

Country	Year	Male	Female
China (Total Sample)	1929-1931	20.5	18.2
North China	1929-1931	20.3	17.7
South China	1929-1931	20.7	18.7
Australia	1931 ¹	29.0	25.3
England and Wales	1930 ²	29.0	26.5
New York State (Exclusive of New York City)	1930 ³	28.8	25.2

¹ See bibliography reference 13, p. 518.

² See bibliography reference 15, pp. 112, 113.

³ See bibliography reference 8, pp. 250-252.

important factor in their high fertility. The average age at marriage is substantially lower in China than in the West, as may be seen in Table 6. The Chinese data, in this case, relate to marriages contracted in the survey year. The average age was lower for females than for males; and for both sexes, but particularly for females, it was lower in the North than in the South. More than half of the males marrying for the first time were under 20 years of age, and in North China, where child marriage is most common, 12 per cent were under 15 years of age. Of the females marrying for the first time, 98 per cent were under 25; 81 per cent were under 20; and in North China 13 per cent were under 15 years of age. The contrast with the West is clear when one considers that in New York State, exclusive of New York City, marriages under 20 years of age constituted only 3 per cent of the total for males instead of the 54 per cent found in China, and only 30 per cent of the total for females instead of 81 per cent as in China.

FERTILITY

Reports of annual births as obtained from single-year surveys have a serious shortcoming in China which is seldom encountered in the West. China is exposed to frequent catastrophes so severe that they undoubtedly have an important effect on reproductive performance. Obviously, the survey was not made in the midst of a

major epidemic, famine, flood, or war. The material presented relates to relatively quiet years, and it must constantly be borne in mind that the results obtained may differ sensibly from those that would have been secured had it been possible to observe average conditions over a ten-year or longer period. The reproductive performance pictured is that of a time when the most ruthless and acute checks on population growth were inoperative.

As was noted in the discussion of the sample, internal evidence suggests that the number of births recorded was somewhat smaller than the number which actually occurred. A further but less definite suggestion that the births during the survey year were not completely reported may be found from the recorded sex ratios at birth appearing in Table 7. In North China there were 112 male births and in South China 113 male births per 100 female births. These ratios may be compared with 108.5 males per 100 females recently obtained by the Central Field Health Station from a series

Table 7. Crude birth rates, births per 1,000 married females 15-44 years of age, and the sex ratios at birth.

	TOTAL SAMPLE	NORTH CHINA	SOUTH CHINA
Births per 1,000 Population	38.3	37.4	39.0
Births per 1,000 Married Females 15-44 Years of Age ¹	107.1	101.5	112.0
Males per 100 Female Births	112.6	112.1	113.0
Births			
Total	7,751	3,649	4,102
Male	4,105	1,929	2,176
Female	3,646	1,720	1,926
Population	102,617	97,511	105,106
Areas in which Marital Condition was Reported ¹			
Births (Total)	7,454	3,412	4,042
Population	194,102	91,251	102,851
Married Females 15-44 Years of Age	35,997	16,934	19,063

¹ Exclusive of Cheng, Honan Province (North China) and Tientsin, Chekiang Province (South China), where data relating to marital condition were not collected.

of 54,748 infants born in 227 hospitals.⁵ The odds would be about 6 to 1 against the sex ratio observed in the study of hospitals and that found in the present study arising from independent samplings of the same universe. It seems likely that there was a greater tendency to disregard female than male births.

The crude birth rate computed from the total sample was 38.3 (Table 7.) This is probably a conservative statement of the actual rate, which may well have been over 40.⁶ The rate was definitely higher in the South than in the North, and the sex ratios for the two regions do not suggest that the difference was due to less complete recording of births in the North. Moreover, the higher fertility of the South was achieved in spite of the fact that a somewhat smaller proportion of the females were married in that region. When this difference is taken into account by expressing fertility as the number of births per 1,000 married females 15 to 44 years of age, the higher fertility of the South is even more apparent.⁷ Statistically, the differences are highly significant.

A comparison of the birth rates of a number of countries with those of China is possible from Table 8 which presents both the crude birth rates and the number of births per 1,000 married women 15 to 44 years of age. The two types of rates are not always for the same dates, but in general the comparison is valid. The rates for China were higher than those for each of the other countries listed except the Soviet Republics. Although there may be some doubt as to whether the rates given for India and China show the actual relation of fertility in those countries, it is clear that the birth rate was higher in China than in Japan where, in turn, it was higher than in any Western country listed. In the United States, in 1930, the birth rate was about one-half that for the Chinese sample.

⁵ See bibliography reference 1, page 61.

⁶ All of the rates shown are based on the resident population at the end of the enumeration years instead of at the middle of the years, but the error introduced by this procedure is probably small compared with that arising from incomplete enumeration.

⁷ The records indicate that illegitimacy was negligible in the population considered.

COUNTRY	BIRTHS PER 1,000 POPULATION		BIRTHS PER 1,000 MARRIED FEMALES 15-44 YEARS OF AGE	
	Year	Rate	Rate	Year
China (Total Sample)	1929-1931	38.3	207	1929-1931
North China	1929-1931	37.4	201	1929-1931
South China	1929-1931	39.0	212	1929-1931
India	1931 ¹	34.3	—	—
Japan	1930 ²	32.4	230	1925 ³
Soviet Republics	1928 ³	42.7	—	—
Australia	1931 ³	18.2	154	1929-1931 ³
England and Wales	1931 ³	15.8	131	1927 ³
France	1931 ³	17.4	131	1926 ³
Sweden	1930 ³	15.4	130	1930 ³
United States (Registration Area)	1930 ³	18.9	131	1930 ⁴

¹ See bibliography reference 21, p. 56.

² See bibliography reference 13, p. 502.

³ See bibliography reference 19, p. 133. (Legitimate births only.)

⁴ Computed from official reports.

Table 8. Crude birth rates and births per 1,000 married females 15-44 years of age, for various countries.

The comparison of the rates for the Chinese sample with those for Japan is particularly interesting. The Chinese crude birth rate is definitely the higher, not because married women were more fertile in China but because there were more of them. The Chinese married women were apparently less fertile than the Japanese. But, as appeared in Table 5, 85 per cent of the Chinese women of childbearing age were married, while in Japan only 67 per cent were married. The universality of marriage in China more than counteracts the effect of the lower fertility of married women, yielding a higher crude birth rate in China than in Japan.

Studies of Western experience, with only one clear-cut exception, have shown that the poorer classes are more fertile than the well-to-do. The exception is in Stockholm⁸ where fertility and economic status are positively associated, but where the birth rates of all classes have reached extremely low levels. Data recently assembled by Lamson,⁹ from a series of small samples drawn largely from

⁸ See bibliography references 7 and 10.

⁹ See bibliography reference 11.

urban communities, suggest that the same unusual direct association between fertility and economic status exists in the much more fertile urban communities of China.

Data collected in the present study afford an opportunity to examine the relation of fertility and economic status in the rural population. Field workers inquired not only concerning births during the survey year, but also concerning the total number of children ever born to each married woman. The tabulation of these data for the married women of each tenure-of-land group indicated no association whatever. There was no evidence that married women in the families of land owners were significantly either more or less fertile than those in the families of landlords or tenants.

In order to study the association between fertility and economic status on the basis of data relating to the crop area of the farm, the classification of farms outlined in the discussion of the family was used. (Table 2.) This procedure, it will be recalled, rated the size of each farm in terms of the farms of its own locality, rather than on the basis of its absolute crop area. The first group, therefore, included all the smallest farms of each locality, and the fifth group all of the largest farms of each locality. Each married woman was assigned to the group in which the family to which she belonged was classified. Since the families on the large farms were large, there were more married women in the upper than in the lower groups.

The total numbers of children born per 100 wives are presented in Table 9 for the married women who were 45 or more years of age. The differences in the rates of the different groups are small, but fertility apparently increased slightly with size of farm. This direct association was more definite in the South than in the North. The records indicate that in the South women living on the smallest farms had borne an average of 5.11 children while those on the largest farms had borne an average of 5.87 children.

The significance of the direct association between size of farm

CROP AREA OF FARM ²	TOTAL CHILDREN BORN PER 100 WIVES			NUMBER OF WIVES ³		
	Total Sample	North China	South China	Total Sample	North China	South China
TOTAL	528	507	550	10,700	5,457	5,243
Group I	503	494	511	1,514	735	779
Group II	506	500	513	1,697	847	850
Group III	528	513	544	1,845	938	907
Group IV	535	506	568	2,284	1,203	1,081
Group V	551	519	587	2,946	1,548	1,398

¹ Exclusive of Cheng, Honan Province (North China) and Tehtsing, Chekiang Province (South China), where data relating to marital condition were not collected.

² Group I represents smallest farms of each constituent area. See text for explanation.

³ Total includes women on farms of unknown size, and those not on farms. It does not include 272 women who bore an unknown number of children.

Table 9. The relation of crop area of the farm to the fertility of married women 45 or more years of age at enumeration.¹

and fertility is difficult to determine. If such a relationship were found in the present-day West, it would be interpreted with some confidence as indicating that low income brought into play checks on reproduction. In the present instance this interpretation is difficult to reconcile with the absence of any association between land tenure and fertility. The central fact, however, is that the differences in the fertility of different economic groups are much less important in China's rural population than they are in the West. To the extent that they do exist, they are, like those found by Lamson for urban communities, in the opposite direction.

MORTALITY

Interpretation of the mortality data collected by the survey offers difficulties similar to those encountered in the consideration of fertility. The mortality observed was that of relatively uneventful years, and was undoubtedly less than would have been found over a long period which included years of widespread devastation. Even for such a relatively favorable period the death rates obtained were too low. The records of deaths, as well as those of births, undoubtedly were incomplete. The actual death rate for the entire

sample may well have been over 30 per 1,000 inhabitants, instead of 27.1 as the records indicate.¹⁰

The rates obtained do agree fairly well with those secured from

Table 10. Crude death rates, for several samples of the Chinese population.

Area and Year		Deaths per 1,000 Population
Present Study		
Total Sample	1929-1931	27.1
North China	1929-1931	24.1
South China	1929-1931	30.0
Ting Hsien, Hopch¹ Registration Area		
	1932	31.6
	1933	27.2
	1934	22.6
	1935 ²	29.1
Tinghsien City		
	1933	32.3
	1934	25.8
Sample Village		
	1933	21.6
	1934	18.8
	1935 ²	36.0
Chujung Hsien, Kiangsu³ (Based on July to December)		
	1934	22.6

¹ See bibliography reference 4, p. 70.

² See bibliography reference 3, p. 10.

³ See bibliography reference 1, p. 56.

experimental registration areas. (Table 10.) The rates for these areas differ from place to place and year to year as conditions change. In this particular, the fact that the enumeration year varied from locality to locality within the period 1929 to 1931 is probably an advantage. The situation pictured is not that of a single year, but of more or less average conditions in a relatively quiet period.

The death rate was higher in the South than

in the North due probably to the warmer climate of the South with its more favorable conditions for the spread of epidemic and infectious diseases. (Table 11.) In the South the death rate for males exceeded that for females, as is almost universally the case in Western experience. In the North, however, the rate was higher for females, reflecting quite possibly the hardships attendant on the inferior status of women in that more conservative section of the country.

Some appreciation of the enormous toll of mortality in China

¹⁰ The death rates are based on deaths during the enumeration years, and, like the birth rates, are expressed in terms of the resident population at the end of the year.

can be obtained from Table 12, which gives the crude death rates for a number of countries. India is the only one listed in which the mortality approximated that of China. The official death rate was somewhat lower than that found in the present study but it doubtless was based on incomplete data. The rates for both Japan and the Soviet Republics were substantially lower than the rates for China, while the rates for England and Wales and the United States were less than half, and the rate for Australia less than one-third of that for the Chinese sample.

The hazards of life in China may be compared with those in several other countries from Tables 13, 14, and 15, which give for each sex at selected ages the probability of dying, the number of survivors from 100,000 persons born alive, and the expectation of life. Since the Chinese tables constructed from survey data have been discussed in detail elsewhere,¹¹ only a few points will be noted in this report.

¹¹ See bibliography reference 17.

Region and Sex	Deaths per 1,000 Population	Deaths in Enumeration Year	Population
TOTAL SAMPLE			
Total	27.1	5,499	102,617
Male	26.7	2,817	105,427
Female	27.6	2,682	97,190
North China			
Total	24.1	2,351	97,511
Male	22.1	1,121	50,633
Female	26.2	1,230	46,878
South China			
Total	30.0	3,148	105,106
Male	31.0	1,696	54,794
Female	28.9	1,452	50,312

Table 11. Crude death rates for each sex.

the Soviet Republics were substantially lower than the rates for China, while the rates for England and

Table 12. Crude death rates, for various countries.

Country	Year	Deaths per 1,000 Population
China (Total Sample)	1929-1931	27.1
North China	1929-1931	24.1
South China	1929-1931	30.0
British India ¹	1931	24.9
Japan ²	1930	18.2
Australia ³	1931	8.7
England and Wales ³	1931	12.3
France ³	1931	16.3
Soviet Republics ³	1928	18.8
Sweden ³	1930	11.7
United States ³	1930	11.3
(Registration Area)		

¹ See bibliography reference 21, p. 52.

² See bibliography reference 13, p. 523.

It must be re-emphasized that the experience on which the life tables were constructed is simply that of a population observed during the enumeration years. The life tables organized this experience *as if it were* the experience of a generation passing through life. Actually, the two are the same only if the risk of death remains unchanged for nearly 100 years. In China any generation must be exposed in some degree to the risks of famine, war, flood, and epidemic. The data gathered during the relatively uneventful three-year period of the present study yield life tables which present a somewhat over-optimistic picture of conditions as

Table 13. Mortality rates per 1,000 population (1,000q_x).

AGE	CHINA ¹ (TOTAL SAMPLE) 1929-1931	INDIA ² 1931	JAPAN ³ 1921-1925	NEW ZEALAND ⁴ 1931	ENGLAND ⁵ AND WALES 1930-1932	UNITED STATES ⁶ 1929-1931
MALE						
0	161.5	248.7	162.0	38.4	71.9	60.9
1	100.9	91.8	48.5	4.5	15.3	9.9
5	29.5	19.3	7.0	1.4	3.4	2.5
10	8.1	7.9	3.2	1.2	1.5	1.5
20	8.3	12.7	10.8	2.4	3.2	3.1
30	9.2	19.3	8.2	2.8	3.4	4.1
40	11.8	29.4	10.5	4.6	5.6	6.8
50	17.7	41.0	18.6	8.9	11.3	12.7
60	38.6	57.9	39.2	18.8	24.2	26.4
70	69.8	97.6	84.8	46.0	60.4	57.3
FEMALE						
0	154.9	232.3	144.0	25.5	54.6	48.2
1	104.7	86.5	47.6	3.7	13.5	8.7
5	27.5	16.5	7.8	1.7	3.0	2.1
10	7.6	8.1	3.7	.6	1.3	1.1
20	11.6	17.6	12.1	1.9	2.7	2.7
30	11.9	25.1	10.5	3.3	3.2	3.7
40	12.7	34.5	11.3	3.7	4.4	5.3
50	16.5	43.1	13.8	6.8	8.2	9.6
60	33.0	54.3	26.4	16.3	17.7	20.6
70	64.0	88.8	61.6	38.5	44.5	48.4

¹ See bibliography reference 17.² See bibliography reference 2, Vol. I, Part I—Report, pp. 173, 174.³ See bibliography reference 16.⁴ See bibliography reference 12, p. 6.⁵ See bibliography reference 14, pp. 48, 49.

COUNTRY AND SEX	AGE					
	0	5	10	20	40	60
China (Total Sample) (1929-1931) ¹						
Male	100,000	64,541	58,670	53,834	44,716	29,642
Female	100,000	64,909	59,431	53,885	42,395	29,207
India (1931) ²						
Male	100,000	60,161	56,467	51,203	34,563	14,933
Female	100,000	62,817	59,369	52,833	32,778	13,210
Japan (1921-1925) ³						
Male	100,000	75,567	73,749	69,336	57,618	38,517
Female	100,000	77,110	75,102	69,379	55,536	41,055
New Zealand (1931) ⁴						
Male	100,000	95,086	94,466	92,956	87,388	72,353
Female	100,000	96,491	95,934	94,868	89,288	76,884
England and Wales (1930-1932) ⁵						
Male	100,000	90,069	89,023	87,245	80,935	63,620
Female	100,000	92,024	91,082	89,383	83,690	70,204
United States (1929-1931) ⁶						
Male	100,000	91,869	90,973	89,099	81,685	62,170
Female	100,000	93,362	92,629	91,125	84,468	68,643

¹, ², ³, and ⁵ See corresponding notes on Table 13.

⁴ Data kindly furnished by the Statistical Bureau of the Metropolitan Life Insurance Company.

⁶ See bibliography reference 6, pp. 14-17. (Exclusive of Texas and South Dakota. The data relate only to the white population.)

Table 14. Number of survivors to selected ages from 100,000 persons born alive (l_x), for various countries.

they would have been if such events had not occurred.

Even this picture is not a pleasant one. The mortality in childhood and early adult life is exceedingly high, higher than that in every country listed except India. The infant death rates yielded by the survey records were not higher than those of Japan, but there is reason to believe that there were substantial omissions in the recording of infant deaths. In the late years of life, for which modern sanitation and medicine have accomplished little, the Chinese experience differs less sharply from that of the West. The higher female than male mortality in China arises exclusively from the excessive female mortality during the childbearing period.

This high mortality in the reproductive ages is even more marked in India than in China and exists to some extent in Japan. In the West the female mortality rate rarely exceeds that of males in the corresponding ages even during the reproductive period.

The tables showing the number of survivors from 100,000 persons born alive and the expectation of life for selected ages require little discussion. (Tables 14 and 15.) The terrific mortality of the early years of life in China and India is brought out dramatically by the survival figures. In these countries less than 60 per cent of the persons born alive survive the tenth year, while at age 10 in England and Wales and the United States about 90 per cent, and in New Zealand about 95 per cent of those born are still living. One-

Table 15. Expectation of life in years (e_x) at selected ages, for various countries.

COUNTRY AND SEX	AGE					
	0	5	10	20	40	60
China (Total Sample) (1929-1931) ¹						
Male	34.85	47.58	47.05	40.74	26.84	14.19
Female	34.63	46.95	46.00	40.08	28.05	15.22
India (1931) ²						
Male	26.91	38.96	36.38	29.57	18.60	10.25
Female	26.56	36.61	33.61	27.08	18.23	10.81
Japan (1921-1925) ³						
Male	42.06	50.35	46.53	39.10	25.13	11.87
Female	43.20	50.71	47.00	40.38	28.09	14.12
New Zealand (1931) ⁴						
Male	65.04	63.35	58.75	49.61	32.07	16.22
Female	67.88	65.30	60.67	51.28	33.80	17.30
England and Wales (1930-1932) ⁵						
Male	58.74	60.11	55.79	46.81	29.62	14.43
Female	62.88	63.24	58.87	49.88	32.55	16.50
United States (1929-1931) ⁶						
Male	59.31	59.47	55.03	46.07	29.25	14.73
Female	62.83	62.22	57.70	48.55	31.53	16.05

¹ See bibliography reference 17.

² See bibliography reference 2, Vol. I, Part I—Report, pp. 173, 174.

³ See bibliography reference 16.

⁴ See bibliography reference 12, p. 6.

⁵ See bibliography reference 14, pp. 48, 49.

half of the people born in India scarcely attain their majority and one-half of those born in China die before they are 28 years of age. In New Zealand, on the other hand, one-half of the people surpass even the biblical standard of 70 years.

The expectation of life at birth is particularly interesting because it summarizes the mortality experience at all ages. Unfortunately, it is less reliable than the expectation figures for other ages because of the inaccuracy of the data relating to infant mortality. It appears probable, however, that due to the higher mortality of the reproductive ages the expectancy of

Table 16. Death rates from selected causes of death.

Cause of Death	Deaths per 100,000 Living	
	Male	Female
ALL CAUSES	2,671	2,760
Typhoid	198	194
Typhus	15	12
Smallpox	205	209
Measles	126	118
Scarlet Fever	29	27
Diphtheria	67	62
Cholera	168	159
Dysentery	196	236
Plague	10	6
Tetanus	27	15
Tuberculosis	178	184
Leprosy	9	6
Malaria	30	45
Pneumonia	57	23
Skin Disease	48	38
Accidents and Suicide	122	76
Other Causes	1,003	1,139
Cause Unknown	182	209

females does not exceed that of males in China and in India as it does in other countries. Life expectancy at birth in China is more favorable than in India, and less favorable than in Japan where, in turn, it is much less favorable than in the West. It is greater in New Zealand than in any other country of the world. In Japan today the expectation of life is about the same as it was in Massachusetts 45 years ago, while in China it is not much different from what it was in Massachusetts and New Hampshire nearly 150 years ago.¹²

The higher mortality of childhood and early adult life was largely due to the ravages of contagious and infectious diseases which continue virtually unchecked. Some impression of their

¹² See bibliography reference 18, p. 164.

importance may be obtained from Table 16, which gives the death rates from a selected list of diseases. These diseases account for more than one-half of the total number of deaths. Undoubtedly the rates are not entirely accurate but the general impression given by them is valid. Of the sixteen causes for which information was sought, the five most important were smallpox, dysentery, typhoid, tuberculosis, and cholera, in the order named. This order doubtless changes as epidemics come and go, but the appalling harvest of "preventable deaths" continues.

NATURAL INCREASE

If, by some magic, it suddenly became possible to eliminate the mortality from "preventable causes" of death, sober students might ponder long before utilizing that power. Observers are unanimous in the belief that the population of China is already redundant and that, with existing productive capacities, a large increase in the population can only take place at the expense of a serious decline in the standard of living, which is already pitifully low. A sudden check in mortality unaccompanied by a corresponding drop in fertility would, before many years, drive larger and larger sections of the population to economic levels at which subsistence is no longer possible. Hunger would accomplish what disease was prevented from doing. It is perhaps fortunate that any improvement in mortality rates will, if it comes, come gradually, and may be accompanied by a corresponding decline in fertility.

The rate of growth of the Chinese population during the past fifty years is still a disputed matter. During the enumeration years the survey records indicate that there were 38.3 births and 27.1 deaths per 1,000 population, or an annual excess of births over deaths of 11.2 per 1,000 inhabitants. Superficially this rate of natural increase, which would double the population in less than 65 years, suggests that the population of China has increased rapidly. Unfortunately the problem is not so simple. Since the birth and death

rates are not completely trustworthy, their difference is still less trustworthy even though the bias in the rates is in the same direction. Nevertheless, during the survey years there undoubtedly was a substantial excess of births over deaths. This does not necessarily mean that there has been a long period of population growth, because the figures relate, as has been repeatedly indicated, to a relatively uneventful period. The population increase coming from such periods may have been wiped out entirely in other years of famine, war, and pestilence.

The significance of the observed rate of natural increase lies, not in the information it yields concerning past trends, but in its implications for the future. So long as uneventful periods such as those studied yield a rapid increase in population, just so long will the tragically eventful periods occur. With its present productive capacity, China cannot stand such growth. Here, at least, the Malthusian checks are a grim reality.

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A SUMMARY OF DATA ON REPORTED INCIDENCE OF ABORTION¹

by DOROTHY G. WIEHL

THE problem of abortion is one which has received increasing and widespread attention in recent years. It is an important problem because the maternal deaths associated with previable terminations of pregnancy have been revealed by various studies as an important part of the maternal death rate and also because loss of foetal life before the period of viability is a much more frequent type of pregnancy wastage than stillbirths. Nevertheless, reliable data on the frequency of abortions are very limited and most of the data made available by special investigations refer to selected population groups and are not applicable to the general population. In a recent article,² data were presented on the outcome of 1,525 pregnancies experienced by an unselected sample of 595 married women in New York City. In the present report, data from various sources are assembled in order to review the general indications concerning the incidence of abortion, both spontaneous and induced.

The extent to which deaths associated with the termination of pregnancy before the foetus is viable contribute to the total maternity mortality, is shown in Table 1 for New York City, fifteen states, and for Scotland. Death of the mother occurred before the seventh month of pregnancy in 27 per cent of the cases in New York City and in 32 per cent of the cases in fifteen states which were studied by the Children's Bureau. Both of these studies indicate that death in this early period was more frequent in the United States than in Scotland, where only 21 per cent of the deaths occurred before the last trimester of pregnancy. The significance of these differences in proportional mortality is not easily determined. Such data reveal

¹ From the Milbank Memorial Fund.

² Wiehl, Dorothy G. and Berry, Katharine: Pregnancy Wastage in New York City. The Milbank Memorial Fund *Quarterly*, July, 1937, xv, No. 3, pp. 229-247.

the importance of conditions resulting in non-viable terminations as a cause of maternal mortality, but, since there are no data to indicate the frequency of such terminations, the extent of the risk to life for pregnant mothers during this period is not known. The death rate among women who experience an abortion may be higher or lower than for other types of births, and the rate may vary greatly from one area to another.

There are obvious difficulties involved in obtaining complete reports on early pregnancy terminations, especially illegal abortions. From clients of birth control clinics detailed histories of pregnancies have been obtained, and it seems likely that these women have given complete and truthful statements of pregnancies experienced and type of termination. The results of these studies have provided the principal data to support the very high estimates made for the number of illegal abortions in the population at large. But these women are not representative of the general population since they are selected on the basis of their interest in family limitation, and possibly are more fertile than an unselected sample.

Table 1. Maternal deaths at various periods of uterogestation in New York City, in fifteen states and in Scotland.

PERIOD OF UTEROGESTATION	PER CENT OF TOTAL DEATHS			NUMBER OF DEATHS ¹		
	New York City ¹	Fifteen States ²	Scotland ³	New York City 1930-1932	Fifteen States 1927-1928	Scotland 1929-1932
TOTAL DEATHS	100.0	100.0	100.0	2,041	7,346*	2,465
9th Month or 37+ Weeks	57.2	67.6	59.8	1,168	4,965	1,473
7-8 Months or 28-36 Weeks	15.5		18.8	317		463
Less Than 7 Months or 28 Weeks	27.3	32.4	21.4	556	2,381	529
14-27 Weeks	8.9	9.1	9.4	182	672	233
Less Than 14 Weeks	17.0	17.7	12.0	346	1,299	296
Not Reported	1.4	5.6	0	28	410	0

* Excludes thirty-four deaths for which the period of gestation was unknown.

¹ Hooker, Ransom S.: *MATERNAL MORTALITY IN NEW YORK CITY*. New York Academy of Medicine, New York, 1933. The Commonwealth Fund.

² *Maternal Mortality in Fifteen States*. Children's Bureau Publication, No. 223. U. S. Government Printing Office, 1934.

³ Douglas, Charlotte A. and McKinley, Peter L.: *MATERNAL MORBIDITY AND MORTALITY IN SCOTLAND*. Edinburgh, His Majesty's Stationery Office, 1935.

Two other types of studies have furnished data for more typical populations; these are: (1) morbidity surveys in which the same families are visited at intervals over a period of one or more years, since an abortion or miscarriage results in some illness or a short period of disability, and (2) detailed histories of the termination of previous pregnancies experienced by women who have had a birth registered, are currently in a hospital for delivery, or have reported a recent pregnancy when visited in connection with a morbidity survey. A current or recent pregnancy affords a basis for questioning and assists in obtaining the interest and cooperation of the informant. However, registered births or current hospital deliveries will include relatively few non-viable terminations and only the record for *previous* pregnancies should be used for determining the frequency of abortions. Since there is probably some tendency for women to have repeated abortions, the previous history of women having a current viable birth no doubt gives a minimum rate for non-viable terminations. Furthermore, the histories of previous pregnancies in these studies are obtained from living women which also tends to make the record of previous abortions a minimum. Records of abortions obtained from morbidity surveys are not subject to these selections and have the further advantage that they represent incidence within a specific period of time. Although no special emphasis was placed on obtaining a record of abortions and miscarriages in the morbidity surveys from which data are used in this report, questions were asked concerning any cause of illness or disability, and concerning any medical care received during a period of three or four months. Since other intimate and personal information was told to the investigators, we may assume that the record of abortions is approximately complete.

Frequency of Abortion. The extent of pregnancy wastage³ reported by women on personal interview is shown in Table 2 for

³ Pregnancy wastage is a term adopted by a number of writers to include stillbirths and all previable terminations and will be used in this sense in this report. Abortion is used to include all terminations before the seventh month of pregnancy.

groups of women in various areas of the United States. In this table, there is presented data taken from a number of published reports, some unpublished data from surveys made by the Milbank Fund, and unpublished data from a morbidity survey of 9,000 families in eighteen states, which were kindly furnished by the

Table 2. Outcome of pregnancies from histories given on personal interviews for women in various areas of the United States.

CLASSIFICATION OF POPULATION	YEAR OF STUDY	NUMBER OF PREGNANCIES	PER CENT OF TOTAL BY TYPE OF TERMINATION			
			Total	Live Births	Stillbirths	Abortions
Morbidity Reports on Periodic Canvasses						
18 States (White)—12 months ¹	1928-1931	910	100.0	83.6	1.7	14.7
Cities 100,000 and Over		336	100.0	84.5	1.5	14.0
Cities 5,000 to 100,000		236	100.0	82.2	1.3	16.5
Rural, under 5,000		338	100.0	83.7	2.1	14.2
Cattaraugus Co. (White)—30 Months ²	1930-1932	278	100.0	88.1	4.7	7.2
Pregnancies Previous to One Reported on Survey or Registered						
New York City ³	1935-1936	1,525	100.0	85.4	2.6	12.1
Cattaraugus County, N. Y. (White) ⁴	1936	605	100.0	86.7	2.6	10.7
Previous Pregnancies and Current Hospital Births						
New York City (White Multiparae) ⁵	1931-1932	7,686	100.0	85.0	15.0*	
Chicago (White Multiparae) ⁶	1931-1932	5,840	100.0	86.7	13.3*	
Pregnancy Histories for Clients of Birth Control Clinics						
New York City (White) ⁷	1932-1933	3,106	100.0	69.4	1.3	29.3
Cincinnati (White) ⁸	1936-1937	7,289	100.0	81.0	2.2	16.8
Baltimore (18 Per Cent Negro) ^{9,10}	1927-1932	6,441	100.0	84.4		15.6

* Unpublished data from studies of the Milbank Memorial Fund.

¹ For a complete description of this survey, see Collins, Selwyn D.: Causes of Illness in 9,000 Families Based on Nation-Wide Periodic Canvasses, 1928-1931. *Public Health Reports, United States Public Health Service*, March 24, 1933, xlviii, No. 12, pp. 283-308. Detailed data by size of community and type of termination presented here were supplied by Mr. Collins from unpublished tabulations.

² *Op. Cit.*, note 2.

³ Pearl, Raymond: Fertility and Contraception in New York and Chicago. *The Journal of the American Medical Association*, April 24, 1937, cviii, No. 17, p. 1385.

⁴ Stix, Regine K.: A Study of Pregnancy Wastage. *The Milbank Memorial Fund Quarterly*, October, 1935, xlii, No. 4, pp. 347-365.

⁵ Pearl, Raymond: Statistical Report on the Fifth Year's Operations of the Bureau for Contraceptive Advice. Fifth Report of the Bureau for Contraceptive Advice. Baltimore, 1933, pp. 5-17.

⁶ Moses, Bessie L.: CONTRACEPTION AS A THERAPEUTIC MEASURE. Baltimore, The Williams and Wilkins Company, 1936.

⁷ The proportion of abortions among the current hospital births is almost certainly much lower than among pregnancies in the general population, since the hospitalized abortions will be chiefly those accompanied by a definite morbidity and therapeutic abortions. It may be estimated that the wastage among *previous* pregnancies of these women would be about 18 per cent for the New York women and 16 per cent for the Chicago group.

United States Public Health Service. Most of the surveys were made in recent years, but, except for the morbidity surveys, the pregnancies reported may have occurred over a considerable period prior to the date of the study.

It is of particular interest that the maximum incidence of abortion of all types reported in any of these studies, except that based on the preclinic experience of clients of a birth control clinic in New York City, is 17 per cent of total pregnancies. This maximum rate is reported both for women who eventually attended the Cincinnati birth control clinic and for women in the morbidity survey in cities of 5,000 to 10,000 population. The abortions reported by the women in larger cities and in rural communities in the morbidity survey were a somewhat smaller proportion of total pregnancies, but the differences are not statistically significant. The average per cent, 15 per 100 pregnancies, for all types of communities may be used, therefore, as the indicated rate for this typical cross-section of the general population.⁴

As already mentioned, several factors operate to make the abortion rate among *previous* pregnancies of women with a current hospital or registered birth a minimum, and the rates in Table 2 from histories of this type do tend to be somewhat lower than those obtained from morbidity surveys, with the exception of the studies in rural Cattaraugus County. The low rates for abortions in the Cattaraugus studies, 7.2 per cent in the morbidity survey, and 10.7 per cent among previous pregnancies, are not confirmed by the rate for rural and small-town women surveyed in eighteen states. The conclusion may be ventured, tentatively, that abortions in rural areas are somewhat less frequent than in urban centers but that the difference is not large.

The frequency of abortion reported for cities in these various

⁴ The pregnancy record obtained from the morbidity survey would apply chiefly to married women, although a few illegitimate births are included. Among the 134 abortions reported, two were for single women or 1.5 per cent of the total; illegitimate births among white women were 1.8 per cent of registered births in 1930. All women in the clinic studies are married.

studies shows a range from 12.1 per cent to 16.8 per cent, if the birth control group in New York City is excluded. The lower rate is probably too low but the higher rate is for clinic patients and may be considered a maximum figure for an average urban estimate. As the total number of pregnancies is not usually known, the number of abortions is expressed more frequently as a ratio to the number of registered births. Abortion rates of 12.1 and 16.8 per cent of total pregnancies give ratios of 14 and 20 abortions per 100 births.

The higher ratio of 1 to 5 births is in agreement with that used by Taussig⁵ for rural women but is only half as high as Taussig's estimate for urban women. The ratio of 1 to 2.5 births used by Taussig for cities was based chiefly on histories obtained from clients of the New York City clinic for which data are given in Table 2. The high percentage of pregnancies terminated by abortion which is shown for the preclinic experience of this group does not seem to be representative since it is more than twice as high as the percentages obtained in the two studies made in New York City for unselected groups of married women. These two studies showed approximately the same result and do not give any evidence of a marked excess of abortions in New York City over other urban areas. It is believed that data at present available do not support an estimate for abortions in cities to exceed the ratio of one abortion to five births.

On the basis of 15 to 17 per cent of total pregnancies terminating in the first six months of pregnancy and about 30 per cent of maternal deaths occurring in the same period of uterogestation, it may be estimated that mortality of women experiencing abortions is about twice as high as the mortality of women delivered after pregnancy has advanced beyond the sixth month.

Spontaneous Abortion. In some of the studies from which data in Table 2 were taken, abortions are classified as to whether spon-

⁵ Taussig, Frederick J.: *ABORTION, SPONTANEOUS AND INDUCED*. St. Louis, The C. V. Mosby Company, 1936, p. 26.

POPULATION IN STUDY	SPONTANEOUS ABORTIONS		TOTAL PREGNANCIES EXCLUDING ILLEGAL ABORTIONS
	Per Cent	Number	
Baltimore Birth Control Group	10.7 ¹	649	6,082
Cincinnati Birth Control Group	9.1	612	6,706
New York City Birth Control Group	7.7	186	2,420
New York City—General	9.2	137	1,481

¹ Includes therapeutic abortions; addition of therapeutic abortions for the Cincinnati and New York City birth control groups makes these percentages 9.6 and 9.2, respectively. Eighteen per cent of the Baltimore group were Negroes, and spontaneous abortions probably are somewhat more frequent among Negroes. For the general population study in New York, inclusion of therapeutic abortions gives a percentage of 9.5.

Table 3. Frequency of spontaneous abortion.

taneous or induced. The reported frequency of spontaneous abortion is shown in Table 3. This information is given for the three clinic groups, for which it is thought to be especially reliable, and for one general population group in New York City.

From 8 to 10 per cent of all pregnancies, exclusive of those terminated by an illegal abortion, resulted in spontaneous abortions. These occurred apparently at a fairly constant rate for these groups which are known to differ greatly in their socio-economic composition.⁶ It is believed that an average rate for spontaneous abortions of about 9 per cent, among white women, or a maximum of 10 per cent, is a fairly dependable base line from which the per cent of illegal abortions may be estimated, when data on total non-viable terminations are available. A record of such terminations is obtained much more easily than information concerning the type of abortion.

Illegal Abortions. Concern over the problem of abortions centers chiefly on the number of illegally induced abortions, because there is an especial hazard to the mother's life in this type of abortion. Their reported incidence for the birth control clinic groups and several general population groups is presented in Table 4. For the groups not selected on the basis of interest in contraception, less than 4 per cent of pregnancies were stated to have been interrupted

⁶ Analysis of the outcome of pregnancies of women in the general group and the birth control clinic group in New York City showed no significant variation in the frequency of spontaneous abortion according to economic group or according to order of pregnancy.

GROUP STUDIED	ILLEGAL ABORTIONS		TOTAL NUMBER OF PREGNANCIES
	Per Cent	Number	
Baltimore Birth Control Clinic Group	5.6	359	6,441
Cincinnati Birth Control Clinic Group	8.0	583	7,289
New York City Birth Control Clinic Group	22.1	686	3,106
New York City—General	2.9	44	1,525
New York City—Multiparae in Hospital ¹	3.2	244	7,686
Chicago—Multiparae in Hospital ¹	2.1	120	5,840

¹ Available figures are for current hospital births and previous pregnancies combined. It is estimated that an adjustment for the relatively low percentage of illegal abortions among current births in the hospitals would raise the percentages for these groups about one-third.

Table 4. Incidence of illegal abortions.

by an induced abortion. The studies by Pearl of total reproductive histories for women delivered in various hospitals in New York City and in Chicago, and similar histories for women in New York City interviewed at home after reporting a recent pregnancy during a morbidity survey, are in close agreement, as the frequency of induced abortions varies from a little less than 3 per cent to about 4 per cent. The percentages for clinic groups in Baltimore and Cincinnati are 5.6 and 8.0, respectively.

On the basis of 14.7 per cent for total abortions, shown in Table 2 for pregnancies reported in the morbidity survey in eighteen states, we may estimate that about 5 per cent were illegal abortions. Although slightly higher than the proportion from histories of *previous* pregnancies, and lower than that for clinic groups, it corresponds well with an estimated per cent between the low and high rates obtained from these two types of studies.

SUMMARY

From three types of investigations, data showing the outcome of pregnancies were assembled. The studies included: (1) preclinic pregnancy histories for clients of birth control clinics in three cities; (2) histories of previous pregnancies for women who had had a recent birth; and (3) pregnancies reported during a morbidity survey in which the same families were visited at short intervals over a period of one or more years.

Total abortion rates for urban samples studied varied from 12.1 per cent to 16.8 per cent; and the weight of evidence favors a rate of approximately 15 per cent of total pregnancies, or 18 abortions per 100 live and stillbirths.

Spontaneous abortions were found to occur in 9 to 10 per cent of pregnancies.

Illegal abortions reported varied from slightly less than 3 per cent to 8 per cent, 4 or 5 per cent of total pregnancies being the most probable rate for married white women in the general population.

Limited data for rural communities suggest that abortions may be somewhat less frequent in the rural areas.

IMPAIRMENTS IN A RURAL POPULATION

by RALPH E. WHEELER, M.D.

III. PHYSICAL EXAMINATION AND LABORATORY DATA¹

IN PORTRAYING the results of an analysis of medical examinations, the temptation is great to overstress the more objective findings of the physical examination. The physical examination, however, is likely to bring out the objective findings that can be seen, heard or felt, to the exclusion of more unobtrusive but frequently quite as significant pathology. Moreover, few even of the objective findings indicate the presence of diseases or defects when taken by themselves. Of what significance, for example, is the highly objective physical finding of an abdominal mass or the laboratory findings of urinary albumin or blood in women of child-bearing age? Yet these are not isolated examples. Even the dermatologist finds himself hardly less than the internist under the necessity of making a number of quite subjective observations in determining the significance of his findings.

The degree to which the history record can supplement these limitations has been discussed in introducing the history data. There are, however, many instances in which the history data fail to give enough information to determine significance or to establish a diagnosis. This gap has been filled very materially in many cases by special examinations: laboratory, X-ray, and clinical. Of these special tests, urinalysis and chest X-ray only were used routinely at the clinic, and both were found most useful supplements for their respective fields. The record remains, however, incomplete and probably therefore minimal in several important respects, including eye and ear, dental, gastro-intestinal, and gynecological defects.

A final qualification of the significance of physical findings may

¹ This is the third in a series of notes on the physical status of a rural population. The first appeared in the Milbank Memorial Fund *Quarterly* for July, 1937, and the second in the October issue.

be introduced by the examiner and the type or pattern of examination made. In the present instance, two different examiners performed the larger part of the examinations, and somewhat different examinations were performed by each. Where the two were found to cover the same ground, it has already been noted that rather strikingly uniform findings were secured; but where it is known that one examiner made extra observations, the records of that examiner were used both for the findings and for the population base in determining rates. For this reason, case totals have been omitted from the table of this section and are recorded in the text only as an index of the relative prevalence of specific conditions in grouped categories.

With these observations on the nature of the findings of the physical and laboratory examinations in mind, the data presented in Table 5 may be reviewed. As in the case of the history data offered in Table 4, these data are in the form of crude percentages corrected for sex and percentages standardized for age and sex, the latter designed to indicate the prevalence of stated findings in a white population of the type found in the rural United States. For reasons previously given, the true sample rates are felt to represent in general minimum, and total sample rates maximum, values.²

WEIGHT. Weight and height determinations at the clinic were made before the subjects removed their house garments or shoes. An allowance had therefore to be made on both weight and height readings, and the data may therefore be regarded as approximate only. A record was kept of the physical appearance of the patient, and a more detailed study of these data in relation to those of weight and height is projected.

EYES. The eyes were routinely inspected, eye motions and pupillary reactions tested, and vision measured by Snellen test chart. Most of the defects noted in the inspection of the eyes were acute or were

² *Italics* have been used in the table to indicate more detailed subdivisions of the broader categories first presented.

symptomatic of other types of illness; a few were definitely localized to the eye and achieved importance because of their effect on vision so that it seems more logical to discuss them in that connection. *Distance vision* only was measured, and the degrees of defect found for one or both eyes have been shown successively. In the first category (20/30 or worse), there were 265 cases for the total sample. The most frequent causes of the very prevalent deficiencies noted were probably refractive errors which could be, and to a very limited extent were, corrected by glasses. Strabismus was recorded only fifteen times in the total sample and was usually associated with marked differences in the vision of the two eyes.

The data on *blindness*, or virtual blindness, refer likewise to the vision of one eye or both, but data for all ages are included. In five cases only was there bilateral involvement; in two of these the cause appeared to be bilateral cataract; in one a long-standing case of glaucoma; in one syphilitic interstitial keratitis, and in one the end results of conjunctivitis in early infancy, probably gonorrheal. The latter two cases were materially improved after the clinic visit, the first by antisyphilitic therapy and the second by operation. Twenty patients showed unilateral blindness: ten from unknown causes, four from former injury, four from cataract, and two from strabismus.

EARS. The data on the ears include the findings for some 700 individuals examined with an otoscope. In this group *impacted cerumen* was found to be quite prevalent, commonly in one ear only. As an effort was made to see the ear drum, the wax was usually syringed out and not infrequently small foreign bodies (beans, wads of paper, etc.), inserted in early childhood, were found in the wax. *Deafness* was measured solely by the necessity of conversing with the patient in raised tones, and therefore applies primarily to bilateral deafness of more than moderate degree. Causes underlying the condition were not often found. Making the total for the category of *other ear* are eight cases of the group exam-

FINDING	PERCENTAGE WITH STATED FINDING ¹		PERCENTAGE STANDARDIZED FOR AGE AND SEX ²	
	True Sample	Total Sample	True Sample	Total Sample
Weight				
20 per cent or more overweight, relative to height and age ⁴	12.0	13.4	12.3	12.5
15 per cent or more underweight, relative to height and age ⁴	6.5	7.6	6.9	7.5
Eyes, Distance Vision				
20/30 or worse, one or both eyes without glasses ⁵	37.3	44.7	38.7	40.5
20/40 or worse, one or both eyes without glasses ⁵	25.5	32.7	26.6	28.8
20/50 or worse, one or both eyes with glasses ⁵	20.0	26.0	21.1	22.3
Blind or perceiving movement only, as above	1.4	2.0	1.6	1.8
Ears				
Impacted cerumen	11.4	11.2	11.6	10.8
Marked deafness ⁶	1.6	2.6	a	2.1
Other ear	1.7	1.8	a	a
Nose				
Deviated nasal septum, moderate or marked	8.0	11.0	8.4	10.4
Deviated nasal septum, marked only	3.2	3.4	a	2.3
Hypertrophy of turbinates	4.2	4.6	4.1	4.7
Other nose	1.7	2.0	1.7	2.0
Mouth				
Pyorrhea and gingivitis	14.3	14.7	15.5	14.1
Dental caries, one or more cavities	41.1	38.7	40.6	39.2
Dental caries, five or more cavities	12.2	11.5	12.1	11.1
Teeth lost, one or more missing	47.4	53.9	51.1	50.8
Teeth lost, one set or both	13.0	20.0	16.0	16.6
Other mouth	1.7	1.9	1.7	2.0
Throat				
Tonsils enlarged, buried or infected	46.0	43.0	46.2	42.4
Tonsils enlarged	26.7	22.8	24.6	22.0
Tonsils buried	16.5	17.4	18.4	16.6
Tonsils infected	7.9	8.3	8.2	8.2
Thyroid				
Diffuse or nodular enlargement	2.8	2.9	2.9	2.6
Diffuse enlargement (simple goiter)	1.5	1.7	1.6	1.5
Heart				
Heart disease, all forms	1.8	3.6	2.5	3.1
Valvular and congenital	0.4	1.0	a	a
Blood Pressure				
Systolic pressure, 160+ mm. ⁸	9.2	13.2	9.0	9.4
Lungs (including X-ray findings)				
Nontuberculous pulmonary disease	0.6	1.5	a	1.4
Abdomen				
Findings interpreted as gastro-intestinal	1.2	1.3	a	1.3
Findings interpreted as female genital ⁷	1.3	1.5	1.3	1.5
Renal ptosis	1.3	1.2	a	1.2
Hernia, all forms	3.0	5.4	3.4	4.6
Hernia, inguinal	2.2	4.4	2.6	3.6

FINDING	PERCENTAGE WITH STATED FINDING ¹		PERCENTAGE STANDARDIZED FOR AGE AND SEX ²	
	True Sample	Total Sample	True Sample	Total Sample
Male Genital ³				
Hydrocele ⁴	2.2	3.2	2.8	2.8
Varicocele ⁵	8.8	8.1	11.6	7.4
Other genital ⁶	4.0	5.6	4.0	5.7
Spine				
Kyphosis and scoliosis	4.4	7.4	4.9	6.7
Other spine	0.8	2.2	a	1.9
Extremities				
Flat foot and foot strain	2.8	3.1	3.0	2.7
Varicose veins	2.4	4.8	2.8	4.0
Arthritis, all forms	3.5	4.5	3.9	3.6
Arthritis, hypertrophic or atrophic only	2.3	3.1	a	2.5
Injuries	3.1	3.7	a	3.4
Other extremities	1.8	2.2	a	2.0
Central Nervous System				
All organic findings	0.5	1.1	a	1.2
Skin				
All dermatological conditions	9.0	12.1	9.0	11.6
Laboratory (Urinalyses)				
Albumin (all degrees)	3.8	3.8	3.9	3.8
Glycosuria (all degrees)	4.4	4.9	4.6	4.2
Glycosuria (1 per cent or more)	1.2	1.3	a	a
Sediment, white cells numerous	3.4	4.2	5.2	4.1
General Conditions				
Arteriosclerosis	3.1	4.6	a	a
Nephritis, acute and chronic	1.2	1.8	a	1.6
Diabetes	1.5	1.4	a	1.2
Anemia	0.5	1.0	a	a
Syphilis, clinically evident	0.0	0.6	—	a
Cancer	0.2	0.4	a	a

¹ Limited numbers make standardization impossible.

² The total sample examinations came to 1,224 of which 560 were performed on males and 664 on females. Of these, 744 formed the true sample: 349 males and 395 females. In the case of defects of the ear, male genitals, and extremities, and in the rates for inguinal hernia and syphilis, the population and cases of a single examiner were used.

³ The crude percentages have been corrected for sex.

⁴ Standardized to rural white population, United States Census, 1930.

⁵ Medico-actuarial tables used for adults; Baldwin-Wood tables for children under 20.

⁶ Not tested under 5 years of age; data based upon persons examined, 5 years of age and older.

⁷ Applies to bilateral deafness and was measured only by the need for conversing in raised tones.

⁸ Rates based on females examined only.

⁹ Rates based on males examined only.

Table 5. Percentage of all examined persons¹ in the true and total samples with specified findings determined primarily on the basis of physical or laboratory examination.

ined otoscopically in which pus discharge from one or both ears indicated an otitis media which was either chronic or recurrent, and five cases in which the ear drum appeared on otoscopic examination markedly scarred, thickened, or perforated. Some history data, omitted from the history section because it was planned to introduce them at this point, have supplemental interest in connection with the above data on chronic or old healed otitis. All persons examined at the clinic were questioned on previous history of "ear discharge," acute or chronic. Eighty-four persons answered in the affirmative for the total sample. If reliance may be placed upon the history data, therefore, 15 to 16 per cent of the cases of otitis media result in chronic otitis or in marked ear drum changes in this area.

NOSE. The anterior nares were examined with a nasal speculum. The disorders and defects of the upper respiratory passages are particularly difficult to classify because in not a few cases the normal and pathological variations are frequently matters of opinion. It has, however, seemed possible to present the data in enough different ways so that different criteria as to pathology could be satisfied. *Deviated nasal septum* did not *per se* cause nasal occlusion so that only marked degrees of this condition may have significance. In only three instances out of a total of twenty-five cases was marked nasal septum deviation traceable to former injury of the nose with fracture. *Hypertrophy of turbinates* was comparatively prevalent, and the variation from normal therefore not easily established; it is in conditions such as this that the data tend automatically to be recorded in the direction of marked rather than minimal or moderate. *Other nose* includes for the total sample twenty-two individuals: three with nasal polyps, two with extensively perforated nasal septum, and the remainder with chronic nasal and postnasal discharges otherwise unclassified.

MOUTH. The examination of the mouth included study of the lips, gums, teeth, and tongue.

Pyorrhea and gingivitis include a number of cases with simple

deposits at the gum line due to neglect of teeth; the differentiation of pyorrhea from the latter condition should have been made a routine part of the examination.

Dental caries was found to be very prevalent after the age of three years. Where extensive caries was encountered in the deciduous teeth of young children, an almost invariable finding was that the mother admitted a definite aversion to the use of milk in her own diet. The same correlation could not be drawn between extensive caries in the second set of teeth and the patient's own diet. Unfortunately, no specific data were recorded on either of these points.

The data on *teeth lost* are chiefly of significance where a large enough number have been lost to affect mastication. It was found impractical to attempt a distinction between deciduous teeth lost and permanent ones, so that where one or two teeth were missing at younger ages the data include such developmental losses. A not uncommon finding in persons with one or both sets of teeth removed was that dentures were not used to replace the missing set or sets. In some instances dentures had been made but their use discontinued because of discomfort, breakage, or loss.

The category of *other mouth* includes five cases of alveolar abscess (one with osteomyelitis of the jaw), four cases of lingua geographica, four cases of markedly defective eruption of teeth, two cases of superficial infection (angina and thrush), two cases of hare lip (one associated with a high degree of cleft palate), and three conditions not easily classified.

THROAT. Few physical examination findings are more difficult to classify than those of the *tonsils*. The data are presented here in detail and in what seems the most useful combination of the three individual categories. It may be recalled that the findings of two examiners, working quite independently over two different periods, agreed quite closely on these as on many other findings. Mere agreement upon objective findings is not, however, sufficient

grounds for establishing their significance. Tonsillar status can best be evaluated on repeated examination and in conjunction with the record of illness attributable directly or indirectly to tonsil disease. Neither of these supplementary observations were fully available to the clinic examiners, and the tonsillar findings must, therefore, remain as classic examples of objective findings whose significance remains doubtful because of lack of further information.

Thyroid. The thyroid was palpated and slight degrees of physiological enlargement (at puberty and menstruation in women) not infrequently found. These were not included in the data given here. *Diffuse or nodular enlargement* were rarely encountered in men. *Diffuse enlargement* was uncommon in this section of the country which lies somewhat east of the "goiter belt."

The thyroid findings offer another good example of the discrepancy between the significance of simple objective findings and that of more generalized observations. Only six persons in the total sample showed clinical evidence of thyroid dysfunction: three instances of hypothyroidism, and three of hyperthyroidism. The former consisted of two cases apparently congenital, and one following an operation for hyperthyroidism. The latter were cases of adenomatous goiter, one in an advanced toxic stage. Four persons had undergone thyroidectomy prior to coming to the clinic.

HEART. The heart was examined by percussion and auscultation. History data and X-ray findings were also taken into account, the latter with recognition of the limitation of a four-foot plate in determining absolute and relative heart measurements. Data on heart defects must be interpreted with the same reservations as those made for other serious conditions, namely, that advanced stages were unable to come to the clinic for examination.

Heart disease, all forms, includes a total of forty-four cases of which all but thirteen were cases of chronic myocarditis in elderly persons. The single case of advanced hyperthyroidism noted above showed cardiac changes, and is also included in this group. Mod-

erate degrees of cardiac enlargement on physical and X-ray examination were more commonly encountered than the figures here given would suggest, but the history and other data were not always confirmatory. Few of these cases showed edema or other evidence of decompensation and only one showed auricular fibrillation.

Valvular and congenital defects made up the balance of the conditions listed under the foregoing general heading. They occurred chiefly in younger persons and were divided for the total sample as follows: mitral stenosis, five cases (two with aortic stenosis as well); mitral regurgitation with enlargement, one case; aortic regurgitation, three cases (two proven syphilitic); pulmonic stenosis, two cases; coarctation of the aorta, one case; and finally, one case with marked enlargement of the heart present, according to history from birth, but unclassified.

BLOOD PRESSURE. Blood pressure was measured on the first 500 patients with a mercury manometer, and on the last 700 with an aneroid manometer checked periodically against the mercury instrument. The patient was usually seated when tested. The measurement of blood pressure was a new experience to many of the patients, and this, together with the fact that one observation is commonly regarded as fallible, caused some uncertainty as to the usefulness of reporting these data. However, it was found possible to re-test twenty of the 118 persons here reported as hypertensive during a period of a few months to three years after the original reading in the more familiar surroundings of their own homes. Of the twenty, five dropped below 160 on the subsequent test, an apparent "error" in the first measurement of 20 per cent. However, the diastolic pressure in all but one of these cases remained elevated, 95 mm. or more; and the impression is that a more complete re-test would have eliminated very few actually hypertensive persons from the original list.

LUNGS. The lungs were examined by auscultation, percussion, and X-ray, the latter consisting of a flat plate in the case of 400

patients and two stereoscopic plates in the remaining 800. Pulmonary disease was suspected on the basis of history or physical findings more frequently than it was detected on X-ray, but serious pulmonary disease was seldom disclosed by the X-ray when the examiners had not already suspected it. The suspicion was, however, frequently a non-specific one, and the X-ray usually aided greatly in making the diagnosis more exact.

Pulmonary tuberculosis was one of the distinctly uncommon clinic findings, in part because known cases were not invited during the earlier period of clinic operation. Only two cases of active pulmonary tuberculosis were found in the total sample. The clinic findings on this and other types of tuberculosis will be taken up in a separate analysis.³

Non-tuberculous pulmonary disease includes seven cases with a tentative diagnosis of bronchiectasis, three cases showing delayed resolution of (or unresolved) pneumonia; two cases with chronic pulmonary emphysema; one case with pulmonary infarct from a syphilitic ulcer of the leg; one case with anthracosis (the patient was formerly a coal miner); one case with silicosis (the patient had been a knife-grinder); one case with cancer of the lung; and two cases with lung lesions as yet undiagnosed.

ABDOMEN. The abdomen was examined by inspection and palpation. *Findings interpreted as gastro-intestinal* were notably few. The symptomatic data presented in the history section indicate that there were many more defects (perhaps largely functional in character) than those actually found. This discrepancy points to one of the signal limitations of routine methods used in the physical examination of the abdomen. The special tests of the function of the gastro-intestinal tract are far too exacting to apply as a routine, and it seems probable that the best solution for the problem of

³ An analysis of the X-ray findings, with special reference to tuberculosis, of nearly three-quarters of the clinic patients has been made by Dr. John H. Korns: *Tuberculosis in a Rural Population. The Milbank Memorial Fund Quarterly*, January, 1934, xii, No. 1, pp. 47-56.

identifying and appraising gastro-intestinal defects is a very considerably more detailed history.

The cases listed showed for the most part indirect evidence of gastro-intestinal disease, such as spasm and tenderness. One was referred directly for operation and proved to have chronic cholecystitis with calculi.

Findings interpreted as *female genital* were limited to those detected during the course of the abdominal examination and included only ten cases considered to have benign uterine or ovarian tumors. These constitute important defects but are of course not nearly so prevalent as such conditions as uterine malposition, cervicitis, and other defects, which have to be excluded from the present study from lack of data.

Renal ptosis was considered more often than the figure of eleven cases for the total sample would indicate. These eleven represented the more advanced cases encountered. It is noteworthy that few showed symptoms suggesting Dietl's crisis.

Hernia, all forms, was a relatively common finding. Inguinal hernia formed the largest part of the total and will be discussed below. The remainder consisted for the total sample of eleven cases: umbilical hernia, seven; femoral hernia, three; and post-operative hernia, one. In two instances there was found marked diastasis recti and in one instance eventration of the diaphragm not included above.

When questioned during the course of history-taking on the subject of whether they had, or had previously suffered from, "rupture," a standardized 5.6 per cent of persons in the total sample replied in the affirmative. In most instances where a hernia was thus indicated but not found at examination, a history of operation was secured, and it may be deduced that about 20 per cent of hernia cases are operatively treated in this area.

There were twenty-five cases of *inguinal hernia*: twenty-one in males and four in females. In thirteen additional instances among

males the inguinal ring was found to be dilated, but further evidence for hernia was not detected. This latter condition was not considered a defect, although it may have potential significance.

MALE GENITAL. Males were examined for gross defects but the omission of a rectal examination makes the data somewhat incomplete, for prostatic hypertrophy is relatively common at later ages.

Hydrocele was not uncommon and frequently reached a considerable size.

Varicocele was the most prevalent male genital finding, but was seldom of extreme grade.

Other genital includes nine cases of undescended testis (bilateral in only one instance); six cases with atrophic testes (noted in four instances as dating from an attack of mumps), and one case recorded as showing an epididymal cyst. Three of the first mentioned nine cases were small boys who were being treated or had been treated for hernia.

Exact data on *gonorrhea* are notably lacking from both male and female examinations. No acute cases were seen in males although a history of previous attack was occasionally given, but two cases previously diagnosed as gonorrheal vaginitis were seen in female children, and two cases of infection were suspected but not confirmed in adult females. These figures can in no sense be regarded as complete because adults aware of having gonorrhea undoubtedly stayed away from the clinic.

SPINE. This was examined by inspection, and added information, especially as to scoliosis, was obtained from the chest X-ray.

Kyphosis and scoliosis were found separately as well as combined in the same individual, and the data include both individual and combined occurrences of more than slight degree.

Other spine includes twenty-two individuals: twelve with characteristic physical findings of sacro-iliac syndrome, four with a rigid or "poker" spine, four with marked lumbar lordosis, and two with evidence of fracture following old injury.

Not included in the above are five cases of cervical rib, observed on X-ray of the chest. The condition was asymptomatic in all but one instance.

EXTREMITIES. The extremities were examined by simple inspection, primarily for the more common defects listed here. A limited number of cases showing changes in the extremities were due to nervous system defect and are listed under that heading.

Flat foot and foot strain are probably more common than these figures indicate as a number of persons, particularly women, wore metal plates in their shoes. The exact extent of the defect was not then readily ascertainable, nor was it under those conditions a definite handicap.

Varicose veins were comparatively common in women, and sometimes very extensive degrees were found. Only one varicose ulcer was encountered, but scars of old, healed ulcers were more frequent.

Arthritis, as used here, includes not only the two classic types mentioned below but also the localized type which develops and persists after injury to a joint—often a fracture involving the joint. The traumatic form of arthritis was encountered frequently enough to make it seem worth listing under this heading, there being nine examples of it in the total sample. It is possible that it plays a more important role in a rural population as a cause of joint pain than in an urban one.

Arthritis, hypertrophic and atrophic, includes the two generally accepted types of chronic arthritis as distinguished from the traumatic. The form which was entirely or largely hypertrophic was observed thirteen times, and the atrophic six times. Three cases were unclassified. It may be noted that a wide discrepancy exists between the history data and physical findings for these conditions.

Injuries include cases of gunshot wounds, industrial accidents, and other mishaps involving the extremities; cases of traumatic arthritis listed above are also included here. Four cases were seen

with old neglected fractures of arm or leg, untreated despite the knowledge that fracture had taken place.

Other extremities is a category embracing fifteen cases showing a wide diversity of pathology. Three patients had congenital club foot, two of whom had had partial correction; another showed the only case of active tuberculosis of bone (the humerus diagnosed at operation) encountered in the clinic; three showed definite edema of the lower extremities which could not be accounted for.

CENTRAL NERVOUS SYSTEM. Indications of disease of this system were obtained by noting defects of eye movement, pupillary reactions, and deep reflexes: biceps, triceps, and quadriceps. Persons showing deficiencies in these were usually given a somewhat more intensive neurological examination in the hope of making a diagnosis. The defects of this system, like those of the gastro-intestinal system, appear to be largely functional or occult and therefore best explored by careful history-taking. Only thirteen patients were found to have organic evidence of central nervous system disease, and of these not all showed primary afflictions of that system. Three showed residual paralysis from former attacks of infantile paralysis; three showed paralysis resulting from cerebral hemorrhage or embolism; two showed wrist and toe-drop, respectively, attributed to lead poisoning (both were painters by trade); one showed a quite generalized paralysis dating from an attack of diphtheria many years previously; one showed evidence of cerebral birth injury; one had paralysis and gave a history of epileptiform attacks following head injury (subdural hematoma); and finally, two conditions not easily classified were diagnosed by a consultant as encephalomyelitis and meningomyelitis, respectively.⁴

SKIN. The skin was examined simply by inspection during the course of the general examination, and a varied pathology was disclosed. The most prevalent condition was acne, of which eleven instances were discovered of more than average severity. The

⁴ Dr. John L. Eckel of Buffalo very kindly reviewed these two cases for the clinic.

always unsatisfactory diagnosis of "eczema" was next in frequency with nine cases, only one of which was generalized and severe. Tinea, or ringworm infections, were the next in prevalence, with seven cases. The examiner felt that this condition was relatively uncommon. Scars from extensive old burns (with contracture), generalized keratosis senilis and pruritus from undetermined cause were next in order, with four cases of each. The remaining forty-nine cases were scattered over a wide field of skin defects.

LABORATORY (*Urinalyses*). Urine specimens were collected at the clinic in special bottles⁵ and examined with the cooperation of the Cattaraugus County Health Department laboratory.

Albumin was reported in thirty-nine cases, of which seventeen were considered to be cases of acute or chronic nephritis and will be discussed below. Two others were attributed to orthostatic albuminuria, and the remaining twenty cases were considered of doubtful significance.

Glycosuria was also comparatively common, but in the majority of instances was found in very small amounts and in concentrated specimens suggesting reduction from other causes than sugar. The more significant degrees of glycosuria (over 1 per cent) are seen to be less common.

Sediment was found to offer data of uncertain significance owing to the conditions of collection and storage of the specimen prior to examination. *White cells* were the most commonly reported elements and are entered here only when reported as present in large numbers. In only six of the total of forty-three cases were burning or frequency mentioned in the history, and this, together with the fact that three-fourths of the patients with pyuria were females, makes the remaining cases of doubtful significance. To add to the value of this and other urinalysis "objective" findings, a very

⁵ Bottles contained a mixture of powdered hexamethylenamine, three parts, and salicylic acid, two parts, as preservative. The urine was sent to the County laboratory for examination which was usually performed within eighteen hours. Albumin was tested by nitric acid ring test; sugar by Benedict's qualitative test, and the amount—when present—measured by Benedict's quantitative method.

detailed history of the entire genito-urinary tract should be incorporated in the routine examination.

GENERAL CONDITIONS. A certain number of conditions, whose prevalence in a general population is usually conjectural, were observed at the clinic. Their identification, however, rested upon a variety of observations and hence they can be listed under no one organ or system heading.

Arteriosclerosis was suspected not only from the observation of thickened or tortuous arteries, but also from ophthalmoscopic, X-ray, and other sources. The data here given apply to marked cases because some degree of arterial change seems to be almost invariable at the older ages.

Nephritis was considered in connection with albuminuria, hypertension, and urinary complaints. Of the seventeen cases included here, five were acute in character, and four of these followed acute throat infections. The acute cases showed gross blood as well as albumin in the urine, and there was slight, if any, rise in blood pressure. All were children under twelve years of age; one child died a year after examination. The chronic cases were elderly and usually showed marked hypertension.

Diabetes was diagnosed in large part by the urinalysis findings, together with the observations made by physicians to whom cases were referred. Fifteen patients were thus identified, of whom eight had been previously diagnosed as having diabetes, and seven were first discovered at the clinic. Of the former (those already diagnosed), only one was sugar-free and others showed urinary sugar up to 5.0 per cent, the average for the eight being 2.2 per cent. Of the eight patients first diagnosed at the clinic, urinary sugar varied between 1.1 and 4.1 per cent with an average of 2.1 per cent for the group. The patients with foreknowledge of their condition did not in general appear much interested in holding it in check by careful dieting or treatment, although at least one was taking regular chiropractic treatment. Two of the newly discovered patients

refused to follow rational treatment when their diabetic status and its consequences were carefully explained to them. Patients with high blood pressure were much more cooperative about keeping their hypertension under observation.

Two children with advanced diabetes, in one family, died within a year of the clinic visit.

Anemia was recorded chiefly when of a marked and noticeable degree; few cases were checked by blood counts. A total of thirteen cases was found. The basic cause was seldom found. In one case it appeared to be a lack of iron in the diet; in one case there was an associated leukemia; one patient had been reliably diagnosed as having pernicious anemia; one had lead poisoning; one gave a history of menorrhagia, and the remainder were unclassified.

Syphilis. The study was not designed to discover latent syphilis as routine neurological and hematological tests were not included. However, an attempt, usually successful, was made to secure blood for Kline and Wassermann tests where suspicious findings were encountered. Thirty such tests were made, but positives were only encountered, as it chanced, where the clinical evidence pointed strongly toward the infection. Four cases were detected out of 715 persons. Two of the four had been diagnosed prior to the clinic visit and were under treatment; two were unaware of their disease. No cases were seen in the primary or secondary stages. It seems probable that most persons with knowledge of past infection would not have accepted the clinic invitation, so that these data are undoubtedly low even for clinically manifest syphilis.

Cancer was encountered only five times in the total sample, once each as follows: cancer of the lip (recurrent after three years); cancer of the lung (proved at autopsy); cancer of the uterus; cancerous growth in the mediastinum; and metastatic cancer, originally of the breast. In three of the five cases, diagnosis was originally made in the clinic.

The services of the State Cancer Clinic in Buffalo were invaluable

in the examination of patients suspected at the clinic of having cancer. It was the examiner's impression that that institution offered a very definitely needed service in western New York State.

DISCUSSION

The limitations in the interpretation of physical and laboratory findings have been shown to be many, but they are not felt to be insuperable. The real problem presented by the collection and analysis of such data as these is in the differentiation between normal and pathological states. The examiner of a group of relatively "healthy" individuals encounters with rather surprising frequency pathological conditions which he was accustomed to regard as incompatible with health, if not of life, in individuals apparently secure in the tenure of both. These cases are seldom discussed in textbooks and are infrequently encountered in clinics or consulting rooms where sick persons pass in review. They are usually explicable on the basis of the compensatory activities of nature, and do not in themselves offer much difficulty except that they represent extreme examples of a much more common problem—that of the differentiation of normal from abnormal. The physical examination, and in fact the whole medical examination, is better designed to indicate the existence of pathology than to exclude the possibility of it or of its significance. However useful the routine medical examination proves in the hospital, office, or at the bedside, there is imperative need for more subtle tests than those now in general use, to explore the status of large groups with respect to chronic ailments. Some of these could well be designed to pick up defects of function rather than of form.

These observations are not intended to cast doubts upon the validity of the data presented here, for the examination given at the clinic was a careful one, but to indicate that there is great need for more precise methods of study, more exact knowledge of the limits of normal, and better concepts of the significance of defects. The field covered with such refinements could be made even broader.

ANNOTATIONS

THE LAST THIRTY YEARS IN PUBLIC HEALTH¹

THE friends of Sir Arthur Newsholme, and they are many, will welcome this latest addition to the list of his books. It is not, as he says in the introduction, either solely autobiographical or a history of the course of public health during the thirty years it covers. It is, however, a most entertaining commentary on that wide variety of topics and events relating to the public health which have interested him during that period.

The book is in three parts. The first is a somewhat detailed account of his experience during eleven years of official life in Whitehall as Medical Officer of the Local Government Board, the predecessor of the present Ministry of Health. To American readers this is of interest principally as evidencing the great difference between British official procedure and that in this country. The formal official relationships, the importance of commissions and reports, and the necessity for providing uniform procedure for the whole country, are somewhat surprising to those accustomed to the free and easy methods of American health administration. Out of this somewhat confusing maze of reports, memoranda and orders, however, there emerges before the eyes of the reader a solid body of achievement which has transformed the whole course of British health organization and procedure and made their system the admiration of health administrators everywhere.

Doctor Newsholme's central theme is the necessity for an amalgamation of curative and preventive procedures if maximum results are to be obtained. It is presented early in the discussion and is emphasized throughout the book. His views on the control of tuberculosis, of venereal disease, and on maternity and infant hygiene, are soundly based and convincingly presented.

The second part of the book is concerned with his recollections of

¹ Newsholme, Sir Arthur: *THE LAST THIRTY YEARS IN PUBLIC HEALTH*. London, George Allen & Unwin, Ltd. 1937. 15 shillings.

American public health and social work. It contains a detailed itinerary of his travels in America and of his activities at Baltimore and elsewhere. Particularly interesting are his comments on Welch, Sedgwick, and Chapin. The final chapters of this part are devoted to a presentation of the American scene, particularly in public health and social work, as it appears to English eyes. One chapter is devoted to a discussion of the prohibition experiment with which he was in the beginning highly sympathetic. Every American reader will regret that Sir Arthur did not give himself freer rein in his comments on American public health.

The third part, devoted to the increasing socialization of medicine, presents an interesting critique of the Report of the Committee on the Costs of Medical Care and the attitude of the American medical profession in relation to health insurance. The final chapters give a brief account of his observations in Russia, and of other countries where the socialization of medicine is in progress.

Most American readers, on finishing this interesting volume, will be inclined to agree with Doctor Newsholme's essential thesis as to the need for the integration of preventive and curative medicine, and with his further conclusion that successful attack on many pressing problems of health can not be made until more adequate provision, through social insurance or otherwise, is made for the medical care of the less fortunate part of the population.

ALLAN W. FREEMAN, M.D.

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SHADOW ON THE LAND—SYPHILIS¹

ALREADY favorably received throughout the country, and soon to be reprinted in a paper-bound edition suitable for wholesale distribution at minimum expense, *SHADOW ON THE LAND* is recognized as one of the most useful of the many recent contributions to popular literature on syphilis and its control. Other reviewers have pointed out that one of the chief virtues of the book is its simple, understandable style with avoidance, wherever possible, of the use of qualifying phrases and highly technical terms. The author makes free use of anecdotes and examples,

¹ Parran, Thomas: *SHADOW ON THE LAND—Syphilis*. New York, Reynal and Hitchcock, 1937. 309 pages. \$2.50.

a method of writing which enhances the interest of the reader and gives life to the kind of statements often left in the abstract.

The first seven chapters have to do with the clinical and immunological characteristics of syphilis, the history of the disease, its prevalence and trend, the experiences of Scandinavian and other European countries, and the woeful lack of official control facilities in the United States. Although not always presented in a form so attractive to the lay reader, most of the material in this section is similar to that which has been employed by other authors when addressing the public on the same subject. The principal criticism of this part of the book has to do with a practice which the author himself suggests may be questionable when he says, "One is apt to draw erroneous conclusions as to the amount of syphilis." The practice referred to is that of giving prominence to numerical estimates based upon admittedly unsatisfactory data. These estimates are for the most part carefully labeled, but it seems doubtful whether the average reader will remember them as such, or whether he may, for example, be more likely to quote as an established fact the statement that "one adult in ten," "has had," "has," or "will have" syphilis.

Chapters VIII, IX, and X of *SHADOW ON THE LAND* include descriptions of special phases of the syphilis problem, the disease in the Negro, and in industry, prostitution, and the ethical outlook. These chapters present much information which will be new to the layman and from a point of view he should become familiar with. Of special importance is the author's conviction that Government and industry "should not only look for syphilis, but each should carry its part of the load." "If each industry will take responsibility for knowing its own problem, for seeing that treatment is available, and for continuing to give employment to those who seek a cure, the cost to industry will be paid promptly in terms of lower compensation and more efficient labor."

Difficulties encountered, and the content and scope of syphilis control programs are among the subjects discussed in the last four chapters of Dr. Parran's book. As far as this reviewer is aware, *SHADOW ON THE LAND* is the only one of recent books on syphilis which actually tells the layman what machinery must be provided, and how and with what personnel it must operate. It is gratifying to find mention of the part to be played by both official and voluntary health organizations, as well as references to integration with other health activities and the necessity for health departments free from political influence. Such a presentation as this

should give to the civic-minded reader a basis for appraising the syphilis control facilities in his own community and for stimulating provisions for their improvement.

A review of *SHADOW ON THE LAND* would be incomplete without reference to its biographical aspects. Quite apart from its value for educational purposes, the book deserves to be read as an entertaining account of the experiences of a hard-working and enthusiastic health official who devoted several years of full-time service to the subject he deals with and whose activities have carried him over the width and breadth of the United States and into other countries.

GEORGE H. RAMSEY, M.D.

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EVER-NORMAL NUTRITION

IN 1925 at the instance of the Yugoslav delegation, the League of Nations through its Health Organization took steps towards examining means of regulating, from a public health standpoint, the manufacture and sale of food products. Meeting a request from the French Government, the League extended the program three years later to include the subject of nutrition. Now as an outgrowth of this and other inconspicuous incidents,¹ the Mixed Committee of the League submits its final report on the Relation of Nutrition to Health, Agriculture and Economic Policy.² This report, then, is significant as much for what it represents as for what it contains. Behind it we see why this afterthought of the program developed into the main enterprise, a development which was as natural as it was inevitable. For the science of nutrition with its newly-established system of principles and facts had become available for fuller application at a period of intense need, arising from a worldwide nutrition problem which, although probably always present or imminent, was now the more disturbing because attention had been focussed on its severity and extent by the world economic depression.

¹ Limits of space prevent a full description of the League's early work in nutrition, which included a study of the food of Japan, a survey of nutrition in Chile, and the publication of a volume on Nutrition and Public Health.

² Final Report of the Mixed Committee of the League of Nations: *THE RELATION OF NUTRITION TO HEALTH, AGRICULTURE AND ECONOMIC POLICY*. 327 pp. Series of League of Nations Publications, Geneva. II. Economic and Financial. 1937. II.A. 10. New York, Columbia University Press, 1937. \$2.00

Using the firm ground of a physiological approach, the League through its technical and expert committees considered methods of determining impaired nutrition and formulated dietary standards and requirements. Moreover, in a world with abundant food production, glutted markets, falling prices, but with prevalence of serious malnutrition, economic aspects could not be neglected. Apparent to the Mixed Committee on the Problem of Nutrition, comprising agricultural, economic, and health experts, and labor and social representatives, was the need for a policy "... at once to benefit agriculture and promote public health ...". It is in this setting that the present report took form. First, however, from data at hand, and from national reports on agriculture and industry, the several aspects of nutrition were embodied in an interim report of four volumes.³ In this, the dietary and physiological considerations were fully discussed; but the economic and agricultural aspects were only briefly mentioned. Although the first part of the final report describes the influence of an improved dietary upon public health and the second restates the basic principles embodying the science of nutrition, the third concentrates upon the economic and agricultural aspects.

Against the historical background of human dietary experience sketched in Part I, the nutritional principles enunciated in Part II stand out as guide-posts for coming development. By setting out the essential dietary factors, by listing their sources with distinction between calorigenic and protective foods, by describing the diseases attributable to a deficient regimen, and by specifying the dietary requirements for protection against these diseases, Part II presents clearly and succinctly the case for better nutrition. Pointing to the need for standards of optimum rather than minimum nutrition, the report rightly emphasizes that, because of increased demands on physique under certain environmental circumstances and during "sensitive" periods in life, nutrition then must be especially safeguarded. Such emphasis, it may be added, should not create indifference to the ordinary course. In bringing the science of

³ Interim Report of the Mixed Committee of the League of Nations:

Volume I. INTERIM REPORT OF THE MIXED COMMITTEE ON THE PROBLEM OF NUTRITION. (Ser. L. o. N. P. 1936. II. B.3) 98 pp. \$0.50.

Volume II. REPORT ON THE PHYSIOLOGICAL BASES OF NUTRITION. (Ser. L. o. N. P. 1936. II.B.4) 27 pp. \$0.15.

Volume III. NUTRITION IN VARIOUS COUNTRIES. (Ser. L. o. N. P. 1936. II.B.5) 271 pp. \$1.40.

Volume IV. STATISTICS OF FOOD PRODUCTION, CONSUMPTION AND PRICES. (Ser. L. o. N. P. 1936. II.B.6) 110 pp. \$0.75.

nutrition into brief compass, the Committee is to be commended for achieving conciseness with so little loss of precision. To these features it has added the stamp of authority.

Throughout, the monograph is written from an international standpoint, a fact which for the most part enhances its usefulness. In some instances, however, this approach may give rise to certain misapprehensions. In Part II, in enumerating diseases presumably related to diet, the report at times identifies the countries in which such conditions prevail, but more often, for reasons that are valid, draws no distinction. For instance, puerperal infection, cited as one of the commonest causes of maternal mortality, is ascribed in some instances to surgical intervention because of contracted pelvis, a deformity which in turn is attributed to malnutrition, so that to faults of nutrition is assigned no little influence on the maternal death rate. While this is undoubtedly true in some countries, in the United States contracted pelvises are so rare as to contribute negligibly to puerperal infection.

On the premise that prevention rather than treatment of disease must receive more and more emphasis, the report introduces two concepts which seem destined to loom large in the application of improved nutrition. One indicates a new arena; the other, a new aim for health workers. As diagnostic methods improve and dietary surveys yield their inferential support, the combined evidence has strengthened the impression that "much more common [than the recognized deficiency diseases] are the latent states of malnutrition, which may give rise to no visible disease . . ." This concept is by no means new, nor is it fanciful; for years the existence of a latent form of tetany has been an accepted fact. Probably these latent states represent either the incipient stage or a mild chronic stage of the disease. In either event, the menace is twofold: it may go on to the full-blown condition or remain persistently but obscurely in a chronic state. This zone, variously described as "borderline, prodromal, pre-deficiency, or suboptimum nutritional state," becomes marked as the next point of attack. Many believe that this condition is fairly common and are devising and evaluating tests by which to detect it. The goal beyond this is definite: "The opportunity that lies before the science of preventive nutritional medicine rests upon the knowledge that these states exist and upon the proof of the necessity for striving after *optimum* nutrition rather than *minimum* nutrition. . . It has been observed that nutritional research will exercise a greater influence in preventive medi-

cine by increasing the vitality of the human species, with all that implies, than by preventing the frank 'deficiency diseases.' . . . Preventive action against such nutritional diseases as scurvy, rickets, and beri-beri, although superficially more impressive, is probably of less importance to the human race than the acquisition and application of such knowledge as will also improve the general condition and well-being of every man, woman, and child, through the better choice, provision and utilization of foodstuffs." It is scarcely necessary to note that this objective, applying as it does to nutrition, is not advanced to conflict with or supplant existing aims in public health; rather it is directed towards heightening those aims in order to enlarge and enrich their usefulness.

Because food is a factor affecting the health of every individual, nutrition becomes a concern of public health. If the relationship between food and nutrition were solely within the province of preventive medicine, improvement in the state of nutrition among the world population would still be a matter of no little magnitude. But the distribution and availability of food are influenced by a number of economic and social factors. So the report takes us almost imperceptibly from public health into economics where it is so easy to become confused. It is the merit of this report, however, that by skillful simplification it succeeds in clarifying and illuminating what is admittedly a complicated and difficult subject. Nutrition and health, it states in Part III, depend upon diet as reflected in food consumption; agricultural and economic factors, in turn, largely control food consumption. When we list all the elements which enter into the agricultural and economic systems, together with the movements afoot in the social order, and when we try to follow their interplay, we reach not one but many concatenations. It is not necessary to calculate mathematically the possible combinations in order to realize the intricacy of the economic structure. Take the matter of tracing the trends in food consumption—although any other question would put us in the thick of it—the Committee gathered evidence indicating that populations have been changing their food habits for the better. To this progress, three factors have contributed: advances in agricultural production and distribution, increased incomes, and better understanding of dietary needs. Inasmuch as the interests of agriculture in food production and of the public in food consumption are so inseparably linked, it is particularly encouraging to find that progress in nutrition has not been at the expense of agriculture. Although the change in food habits

has brought in its train problems as well as advantages, agriculture, it is stated, did adjust itself to the trend.

This improvement in nutrition, as reflected by dietary habits, is still a trend and not an achieved end. As yet it has moved all too slowly and has covered all too little ground. Despite the favorable change in food habits, the report piles up the evidence of widespread malnutrition throughout the world. Although some may deprecate its accusation as too sweeping and profess skepticism over certain details in the evidence, they will find it difficult to deny that malnutrition, in almost all nations, is no idle and unpleasant threat, but an undesirable and unnecessary actuality. In order to lessen, if not eradicate, this malnutrition and raise nutrition to its proper level, the Committee points to the need of accelerating the present trends in food consumption. This is the "nutrition policy"—to modify and increase food consumption—which the report sets forth and to which it refers again and again.

The attempt to increase and modify food consumption will not, the Committee predicts, run an unimpeded course. The nature and extent of food consumption is a resultant of opposing groups of forces. It reached its present level through the predominance of certain favorable factors; it might have risen to a higher point if opposing forces had not reacted against them. Continued opposition may be expected, and upon the outcome of the reactions will depend the amount and kind of food consumption. The principal factors in this continuous conflict, determining food consumption, are: food prices, income, and education.

In the present dietary trend, advances in agricultural production and distribution have brought lower prices which have stimulated food consumption favorably. For lower food prices, other factors being equal, "tend to result in an increase in the consumption of productive foods." Higher prices, on the other hand, "are likely to have the opposite effect;" indeed, the report shows that price increases were so associated with a decline in consumption of protective foods that they must be counted as a factor in limiting the present trend. But to say that price level influences food consumption is to over-simplify the issue, for price may be resolved into an opposition of reacting forces. What determines the price of a commodity is primarily the law of supply and demand. In this instance, food consumption is a measure of demand. To indicate now that food consumption influences food prices, after having stated in the preceding paragraph that the reverse relation operates, is not a seeming contradic-

tion, but an illustration of their reciprocal nature. According to the report, the factors acting in a positive manner to create and sustain demand are income and education. Opposing these are the factors determining the food supply: production costs, custom tariffs, crop restriction, and distribution charges. Moreover, many "external" factors, such as the supply of and demand for gold, are said to influence prices. Of these factors, the ones contributing most to the maintenance of high prices and thereby checking food consumption, are on the supply side.

Level of income, considered in relation to prices as purchasing power, is likewise examined for its effect upon food consumption. Thus the total outlay for food is said to increase with total income, the result being improvement both in quantity and quality of the diet. Just as high incomes favor more adequate food consumption, low incomes predispose to inadequate food consumption. Citing the consequences of disparity between food prices and incomes, to say nothing of poverty, the report calls attention to the prevalence of "incomes so restricted that purchase of an adequate diet becomes an economic impossibility." Moreover, from data on families in the large cities of the United States, the report draws the conclusion "that considerable proportions of the employed population, and particularly of the negro families, in most of the towns were suffering from malnutrition owing to insufficiency of income."

Education, as a determinant of food consumption, applies to those who are in a position to select their own diets, but especially to the few in family groups who are responsible for the dietary habits of many others. For both groups, education as here used signifies the capacity to acquire knowledge of food values, as well as opportunity to obtain this information and the initiative to use the opportunity. For the homemaker, it includes the ability to apply such knowledge with available financial means in such a way as to make for effectiveness and economy in food allotment. As the report emphasizes, education is a most potent factor. For, at an income level so low that it is questionable whether it will provide an adequate diet, the report reveals that some families successfully meet nutritional requirements, with education as the decisive factor. As a matter of fact, in contrast to an increase in income which benefits mainly those in the lower income group, education helps all groups. It is indeed indispensable to proper nutrition; but, in the opinion of the Committee, its potentialities fall far short of full realization. On the other hand, the report shows that even when income was more than

ample for proper food, ignorance was found to have forfeited this advantage with disastrous results.

It is apparent, the report states, that attempts to raise the level of food consumption both in quantity and quality, as a stimulus to the present trend towards improved nutrition, will face the three obstacles: high prices, poverty, and ignorance. At first glance it would seem desirable to bring about conditions that will surmount these obstacles. Such would be low prices, higher incomes, and education. But far from accepting forthwith this concept, the report turns to examining its effect on the other party in the agricultural-economic system—the producer. If a nutrition policy is to be of lasting benefit to the public, it must, because of the inescapable interlocking of interests, involve a minimum of untoward consequences for the producer; for such consequences, together with their repercussions, would strike producer and consumer alike. In principle, an increase in food consumption would seem designed to promote agriculture as well as nutrition. In practice, the effect on agriculture may not always take such a favorable turn.

So far as a nutrition policy would modify crop structure, it is believed agriculture could probably make the necessary adjustment. But in any contemplated change in food prices, the report advises deliberation and caution. The farmer's income depends on cost of production, volume of sales, and price. The effect of a nutrition policy in promoting food consumption by higher incomes and education would create no detriment to farmers, so long as price was maintained. But lowering food prices as a means of stimulating food consumption, with no compensating reduction in production cost, might bring about, the report warns, such a reduction in farmers' income that the impact would be felt in the industrial market with the familiar train of lowered wages, unemployment, and malnutrition.

The monograph is so informative and inclusive of essential facts that it almost seems gratuitous to point to any imperfections. There are, however, one or two. The title is not technically accurate since there appears to have been a tendency to confuse food and nutrition which resulted in a faulty causal nexus being drawn between nutrition and health. Although there is authority for applying the term nutrition indiscriminately to either nutriment (food) or the bodily process which it supports, many prefer to restrict it to the latter usage. Such a distinction is often convenient. Nutrition and health are then regarded as independ-

ent attributes of the body, which are influenced, usually simultaneously, by food. Accordingly, the title might read more accurately "the relation of nutrition and health to agriculture and economic policy," with the understanding that food is the pivotal point between the state of the body and its economic world.

In a sentence exalting the merits of protective foods in "increasing . . . resistance to many diseases (*e.g.*, scurvy, beri-beri, rickets and other bone defects; dental caries; tuberculosis and bronchial pneumonia, which so often develop from measles, whooping-cough and other children's diseases; and also to such conditions as anemia, night-blindness, etc.)," the indiscriminate listing of these diseases connotes a similarity in their relation to diet which is not borne out by the facts. These diseases fall into two groups: the deficiency diseases, such as xerophthalmia, scurvy, beri-beri, rickets, and anemia which result directly as a specific reaction to a deficiency in the respective dietary constituents, and the other group, including diseases of infancy and childhood, which many *believe* develop in the debilitated state created by moderate or severe *undernutrition*. In the one, diet is the direct and specific cause; in the other, if it may be said to have any influence, it operates as a predisposing, aggravating, or precipitating factor. To ignore this distinction is to confuse the function of diet, its mechanism, its proper place in prevention and therapy, and its intelligent application.

Moreover, there is a vast difference in the available knowledge about the relation of diet to the two groups of diseases. Deficiencies in diet as the specific cause of the first group have been rigidly demonstrated; a deficiency invariably produces its specific effects. In the second group, the relation of diet is still a matter of opinion and not of fact; undernutrition does not invariably produce these diseases.

The report, with statistics and facts assembled from many nations, is lucid, thoughtful, and impressive. What may be a revelation to some is that such a report can be so readable. Distinctive in purpose, nature, and scope, it may well become the source and guide of new developments in the field of human nutrition. As conditions common to all nations, it indicates the undesirable coincidence of malnutrition and agricultural depression. Despite any doubt or disagreement over the methods of assessing undernutrition, the weight of evidence which it presents concerning the extent of undernutrition is not easily dismissed. Inasmuch as the report is predominantly economic in nature, it is here that it marshals

an imposing array of data in describing the perplexing rural problems. Although the Committee protested against discussing one point because it would entail writing the economic history of the world, they have performed a task of little less magnitude—the structure and status of rural economy in the world today.

If the Committee had been content merely to describe existing conditions and problems, their report would still have fulfilled a mission. But they did not stop at that point. Throughout, as the report has pointed to a difficulty, it has at the same time indicated what was needed to overcome that difficulty. This feature alone adds immeasurably to its value. By far its most important contribution, however, is a series of practical and constructive suggestions for action. Hidden in the section of Part I on summary and conclusions, these proposals might go unnoticed. As it is, the space devoted to summary is negligible, and if there be conclusions, they are not the narrow, obvious outcome of syllogistic devices. Instead they are definite recommendations, broad in outline and general in nature as they must needs be if they are to be adaptive to wide and varied use. In no sense are they either official or exclusive methods which must ultimately be used. As improvement in world nutrition is sought, together with stabilization of agriculture, it will be worth while to watch what effect any of these or other proposals will have on a world which, in its bewildered state, has just come to realize that the horn of a cornucopia may be the horn of a dilemma.

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